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# PERFORMANCE STATISTICS BULLETIN HIGH LATITUDE METEOR SCATTER PROPAGATION FEBRUARY, MARCH, APRIL 1989



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March 1991

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**13. ABSTRACT** *(Maximum 200 words)*

A representative sampling of meteor scatter performance statistics is presented from the PL/GP High Latitude Meteor Scatter Test Bed (HLMSTB). The data address questions of meteor scatter propagation under disturbed ionospheric conditions, as well as normal meteor scatter propagation in the polar region. The time and frequency variations of the propagation transfer function are characterized over the 35 to 147 MHz range, i.e. the availability of useful meteor trails, the potential communication capacity associated with those trails, the occurrence and persistence of ionospheric scatter and sporadic E-layers, variations in the signal-to-noise ratios of each scatter return and the effects of auroral and polar cap absorption (PCA) events on meteor scatter propagation and communications. Statistics presented include; Arrival rate, Duration Duty Cycle and noise temperature as functions of Day, Time of Day, Signal Threshold and SNR Threshold. This bulletin is the first of a periodic series.

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# preface

The acquisition and processing of the data represented in this bulletin is an enormous and complex task. The authors are indebted to the tireless and dedicated efforts of many people. Special appreciation is due Don DeHart for his highly ordered and competent management of the data processing operations and Sergeants Anthony Coriaty, Carlton Curtis, David Mura and Douglas Carter for their spirited first quality workmanship ,their willingness to risk freezing in the Greenland field facilities and their skilled work in the laboratory. Others include John Rasmussen, who created this project, also Sergeant Regina Burton and Eric Li who have been key players and problem solvers in the development of field and data processing software as well as first quality workers at the frozen Greenland field facilities.

Delays in the publication process have created some confusion throughout this report. The draft report was submitted for publication as the Air Force Geophysics Laboratory was confronted with a reorganization and merging with other Air Force laboratories to become the Geophysics Directorate of the USAF Phillips Laboratory. Consequently, references to either may appear throughout this report.

This bulletin is intended as one of a periodic series. The meteor scatter performance statistics plots presented herein were selected as a representative sampling of the options available from the PL/GP High Latitude Meteor Scatter Test Bed (HLMSTB) data processing and analysis resource. In addition to the performance information they present, they illustrate the sort of capabilities available to qualified researchers and system designers. Qualified agencies may request additional data analyses or obtain limited access to the PL/GP resource.

The generation of this select set has been automated to facilitate preparation of bulletins on a regular schedule. Comments and suggestions for improving the usefulness of future bulletins are invited.

Address your comments or requests to:

PL/GPIS, Attention: J.M.Quinn

Hanscom AFB, MA 01731-5000.
or TeleFAX (617) 377-7091.

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## 1. INTRODUCTION

This bulletin presents a summary of results obtained from the Phillips Laboratory Geophysics Directorate (PL/GP) High Latitude Meteor Scatter Test Bed (HLMSTB) for the reporting period specified. The prime link, from which these data were derived, is approximately 1210 km long and located entirely within the polar cap in northern Greenland, between Sondrestrom and Thule Air Bases. See Figure 1 and Table 1. This link is an enhancement of the RADC link described by Ostergaard et.al.[1]

The PL/GP HLMSTB meteor scatter research links in Greenland are providing data to address a number of questions concerning meteor scatter propagation under normal and severely disturbed conditions as well as the potential performance of meteor burst communication systems in the polar region. The efforts under this measurement program are concentrated on characterizing the time and frequency variations of the transfer function, including:

The availability of useful meteor trails,

The potential communication capacity associated with those trails,

The occurrence, persistence and effects of ionoscatter and sporadic E-layers,

Variations in the instantaneous polarization and signal-to-noise ratios of each return from a meteor trail and

The effects of aurora and polar cap absorption (PCA) events on meteor scatter propagation parameters and on the potential capacity of 35 to 147 MHz meteor scatter communication systems.

Significant disturbance events which occurred in this reporting period are identified and their effects discussed under section 10. "Supplementary Information," sub-section 10.4 "Disturbance Events During the Reporting Period."

## 2. HLMSTB SITE AND PATH DESCRIPTION

The PL/GP meteor scatter test-bed main path is located entirely within the Polar Cap region with the transmitter at Sondrestrom Air Base and the receiver at Thule Air Base, Greenland. Figure 1 shows the geographical location of the HLMSTB. Table 1 gives information on the geographical parameters of the sites and path features that influence the properties of the test-bed propagation path.

Table 1. Geographical Parameters for the Sondrestrom AB to Thule AB path.

| | Receiver @ TAB | Transmitter @ SAB |
|---|---|---|
| LONGITUDE | $68^0$ 40′ | $50^0$ 39′ |
| LATITUDE | $76^0$ 33′ | $66^0$ 59′ |
| AZIMUTH | $141.8^0$ | $337.8^0$ |
| TERMINAL ELEVATION | 240m | 330m |
| HORIZON ELEVATION | $1.1-1.7^0$ | $1.8-2.2^0$ |
| MIDPATH ELEVATION FOR 100 KM ALTITUDE | | $6.5^0$ |
| GREAT CIRCLE DIST | | 1210 km |

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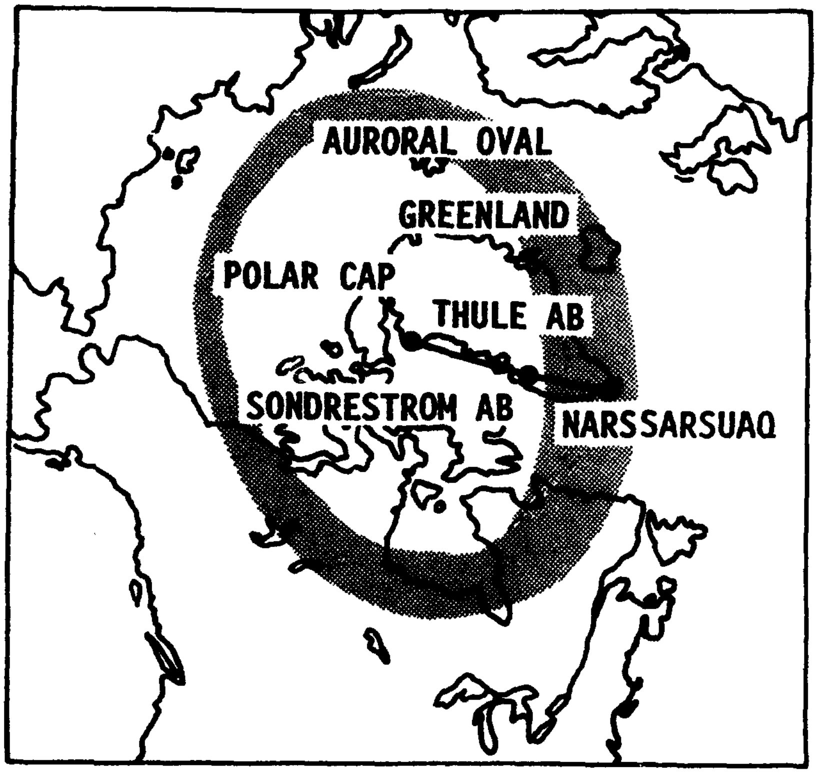


Figure 1. The Geographical Location of the HLMSTB, showing Typical Relation to the Auroral Oval.

## 3. HLMSTB SYSTEM DESCRIPTION

This Test Bed is designed to measure signal strength, polarization and system noise at six frequencies, from 35 to 147 MHz.[1] The frequency coverage is chosen to examine absorption and depolarization from the very low end of the VHF frequency band, where meteor scatter links have maximum yield during undisturbed ionospheric conditions, to mid VHF where very little meteor scatter activity takes place but where absorption and depolarization are much less severe than at lower frequencies.

The transmitter at Sondrestrom Air Base and the receiver at Thule Air Base, Figure 2, are not conventional communication system components. Rather, they were developed to investigate features of meteor scatter from a propagation point of view, as well as from a communication viewpoint. The transmitter sequentially transmits a 400 Hz FM carrier at 35, 45, 65, 85, 104 and 147 MHz. The receiver at Thule measures the characteristics of the meteor scatter returns as well as signals carried by other modes of propagation, originating from the Test Bed transmitter at Sondrestrom AB.

The transmitter antenna polarization is horizontal. It uses five-element Yagis positioned for

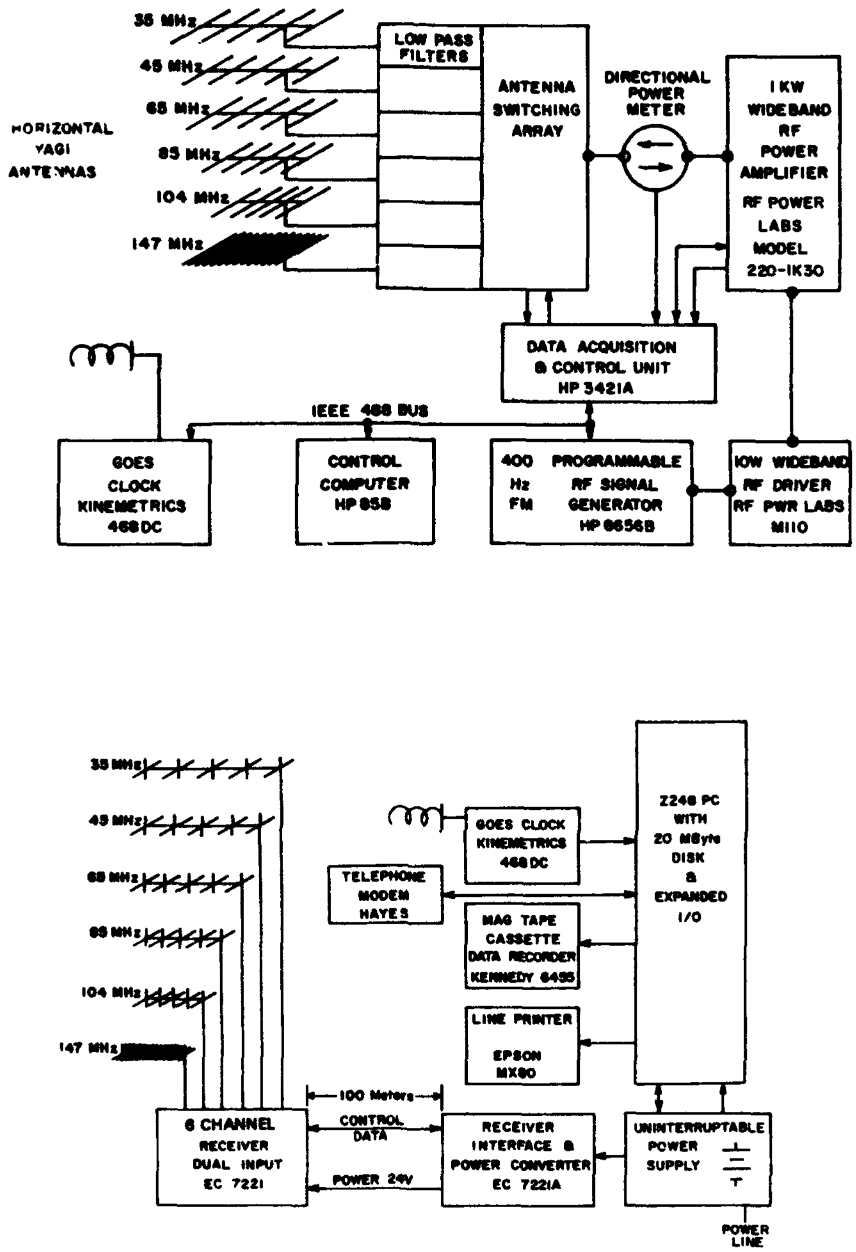


**Figure 2.** Block Diagrams of HLMSTB Instrumentation for the Sondrestrom AB-Thule AB Link.

optimum pattern illumination and gain consistency at all frequencies. Receiver antennas are each composed of orthogonal, linearly polarized (Yagi) antenna pairs for measurement of the horizontal and vertical polarization components. The Yagis are mounted on a common boom with separate lines feeding a six frequency, dual channel receiver with two identical channels at each frequency. Thus the amplitude for each polarization and phase difference between the signals received by the orthogonal antennas can be acquired and used to determine the polarization of the incident wave. The effective noise bandwidth of the receiver is 100 Hz.

## 4. DATA ACQUISITION

The horizontal and vertical polarized channels are sampled every 10 msec (100 samples/sec) and formatted into sequential 5-second records that include signal power of the polarized channels, the phase difference between the vertical and horizontal channels and a flag indicating lock-on to a 400 Hz FM signature. Record displays are shown in Figures 4-8. Those records in which the 400 Hz signature is detected are transferred to a magnetic tape data storage unit and data tape cartridges are returned to the Phillips Laboratory for processing.

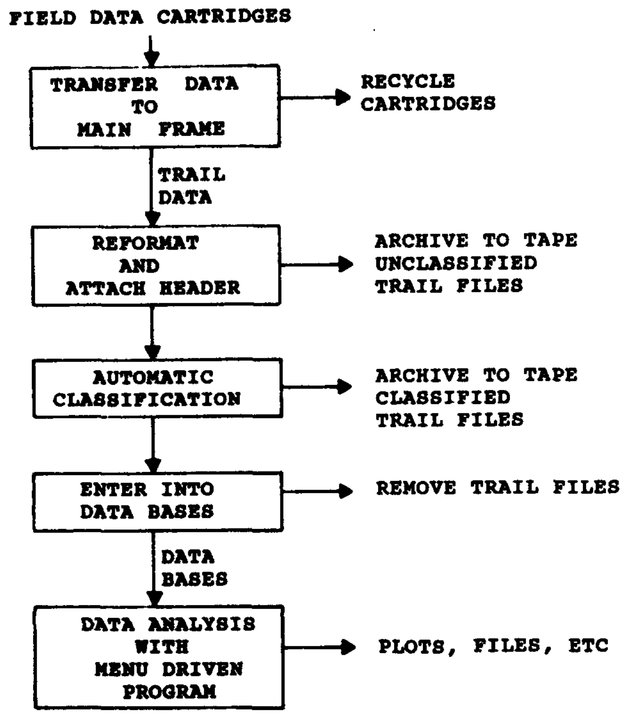


Figure 3. Procedure for Analysis of Data from PL/GP High Latitude Meteor Scatter Test Bed.

## 5. DATA PROCESSING[2]

The data processing procedure is shown in Figure 3. Data are transferred to the PL/GP VAX computer and the date, time, noise level, frequency, and other information are attached to each data record. The next step is classification in which the dominant propagation mechanism in each data record or sequence of records is identified. The final step of the processing procedure is statistical analysis of data in the data bases. These classified data bases can be processed in a number of different ways.[3] The main menu of optional categories appears as Table 2. The principal purpose of this bulletin is to present a representative sample of analyzed data for the specified period.

## 6. CLASSIFICATION[4]

Classification is an important element of the analysis procedure because several different propagation mechanisms are observed on the high latitude test bed. Due to differences in propagation mechanism these modes have different communication and propagation characteristics. In addition to underdense and overdense meteor trails, sporadic-E and low level ionospheric scatter propagation occur frequently. Auroral scatter is not generally observed on the Thule test link, since it is well North of the auroral zone.

**Table 2. Main Menu; Statistical Analysis Options.**

| | |
|---|---|
| 101 | Number of arrivals exceeding a RSL threshold |
| 102 | Number of arrivals exceeding a SNR threshold |
| 103 | Distribution of time above a RSL threshold |
| 104 | Distribution of time above a SNR threshold |
| 105 | Noise level and link-up time history |
| 106 | Distribution of durations above RSL threshold |
| 107 | Distribution of durations above SNR threshold |
| 108 | Time constants |
| 109 | Fading Statistics |
| 201 | Throughput for idealized adaptive system (for all events) |
| 202 | Throughput for idealized adaptive system (for all frequencies) |
| 203 | Throughput for realistic adaptive rate system (all frequencies) |
| 204 | Throughput for realistic adaptive rate system (all events) |
| 205 | Throughput for realistic fixed rate system (for all frequencies) |
| 206 | Throughput for realistic fixed rate system (for all events) |
| 207 | Time required to transmit a message (for fixed rate system) |

The classification system which has been adopted includes four categories of return: underdense meteor trails, overdense meteor trails, sporadic E-layers and unidentified propagation. Some of these classes contain waveforms which agree closely with the classical theory of meteor burst scattering as presented by Eshlemann[5] and McKinley,[6] however, most of the trails are distorted and often difficult to classify. The sporadic E-layer signals are distinctive as they are generally stronger and much longer lasting with slow fades. The remaining low level, fast fading signals are classified as unidentified propagation as they cannot be attached unambiguously to a specific physical propagation mechanism.

## 6.1 Returns from Underdense Meteor Trails

The returns from underdense trails are characterized by a fast rising leading edge and a slower exponential decay. They account for by far the largest percentage of signals observed. Figure 4. shows a number of returns from underdense trails. The maximum amplitudes of the waveforms vary over a range of 40-45 dB and the durations vary from less than 0.1 seconds to several seconds. The occurrence of long duration trails with large maximum amplitude is not well correlated as both returns with a long duration and a small maximum amplitude, and returns with a short duration and large amplitude are frequently observed.

Many underdense returns exhibit fading during their exponential decay phase. This phenomenon is observed on nearly all long lasting trails, and it is attributed to wind moving different portions of the trail to positions and attitudes that fulfill the geometric conditions for scattering between the transmitter and the receiver. These fades can be deep, occasionally reaching down to the receiver noise level; that is, a complete cancellation of the total received power by destructive interference between components of the received signal originating from different parts of the trail (Figure 5.)

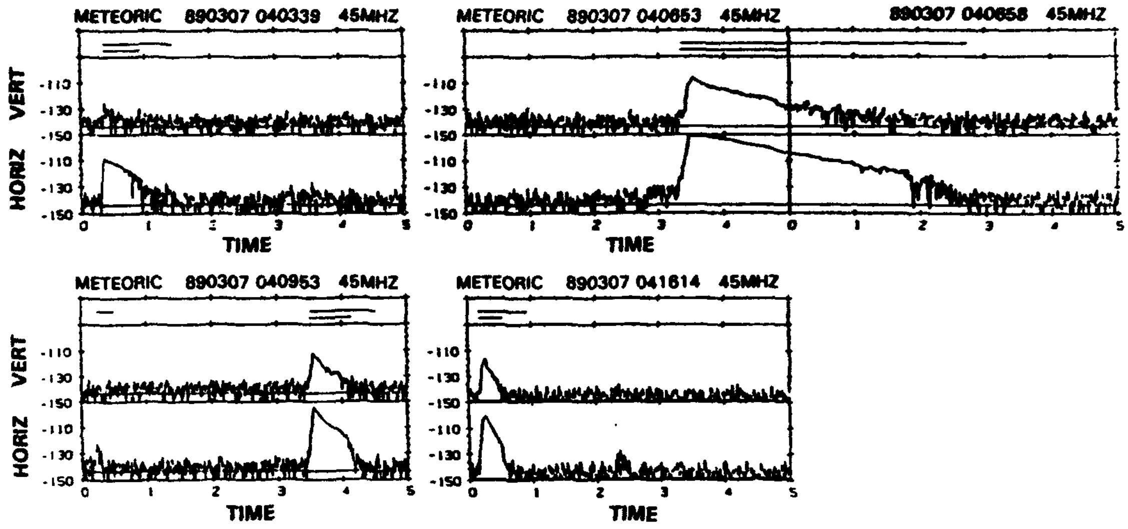


**Figure 4.** *Examples of returns from underdense meteor trails.*

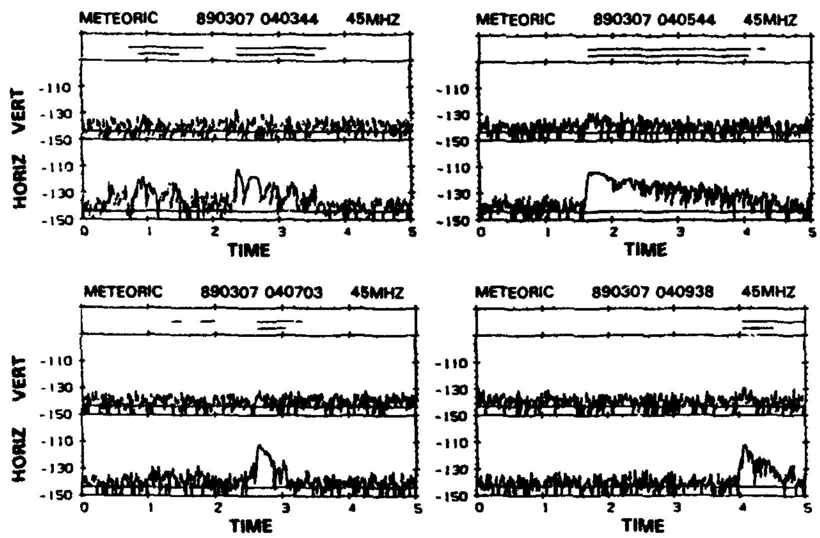


**Figure 5.** Examples of returns from underdense trails with fading from "wind distortion".

power by destructive interference between components of the received signal originating from different parts of the trail (Figure 5.)

The time between the occurrence of successive meteor trails ranges from as little as a few milliseconds to several minutes. Trails often occur with separations in the order of one second or less. The multiple meteor trail returns can either be of approximately the same amplitude or of substantially different amplitudes, and it cannot at present be determined if the two signals came from portions of a fractured micrometeoroid, that is, have the same path through the scattering geometry, or if they are caused by two independent meteorites with entirely different paths.

## 6.2 Returns from Overdense Meteor Trails

The returns from overdense trails are characterized by a fast rising edge, often followed by an amplitude oscillation originating from the meteorite's movement through the scattering geometry during the formation of the trail. Unlike the returns from underdense meteor trails, however, the amplitude continues to increase after the trail is fully formed, and reaches a shallow maximum before decaying exponentially. Examples of returns from overdense meteor trails are shown in Figures 6 & 7.

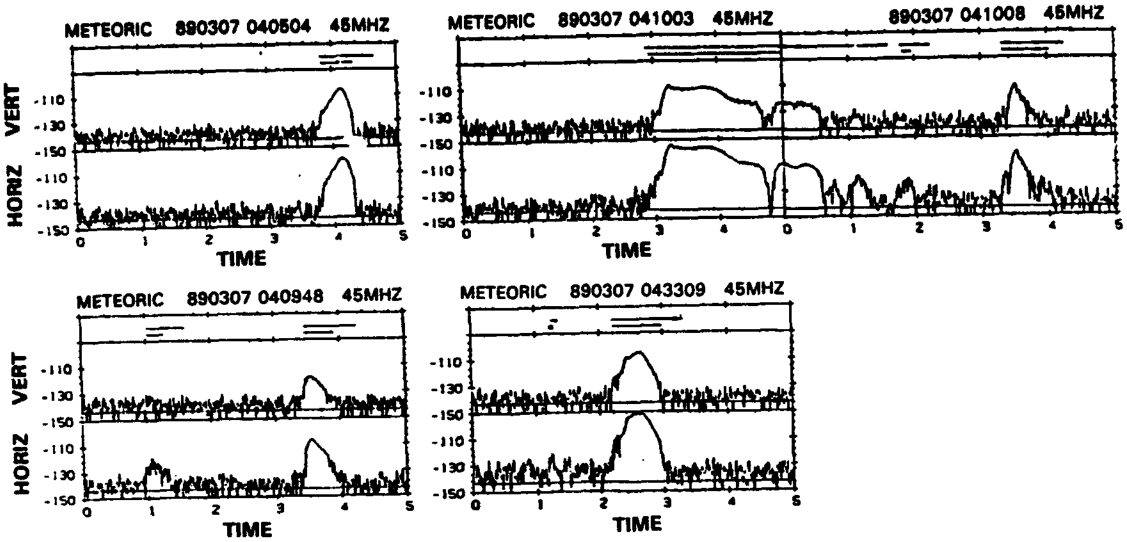


Figure 6. Examples of returns from overdense trails.

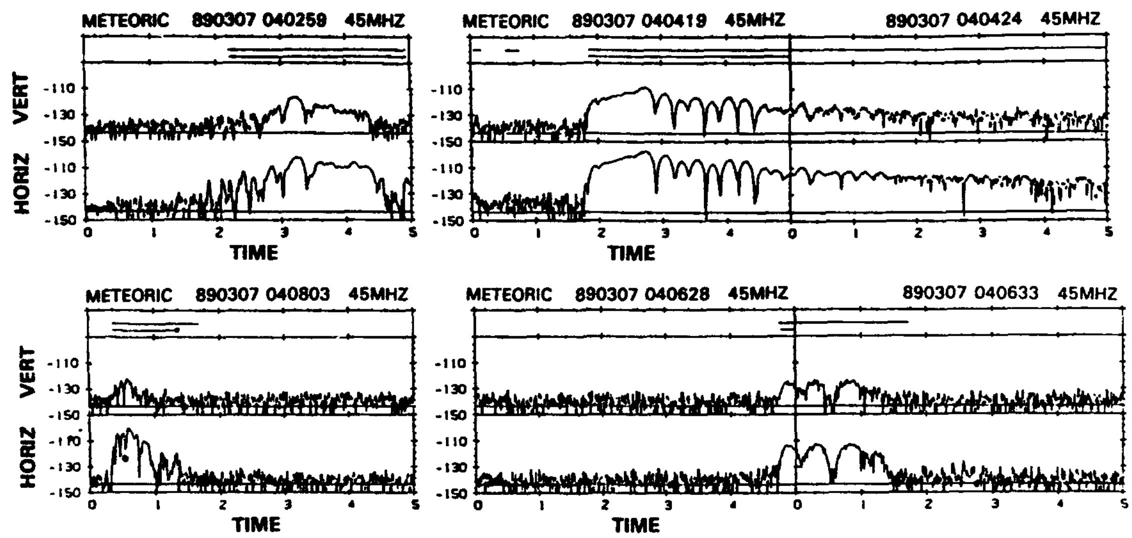


Figure 7. Examples of returns from overdense trails with fading.

The maximum amplitudes are generally larger and the durations longer than those from underdense trails. The majority of the waveforms that last longer than 1 sec can be classified as returns from overdense trails. There are, however, a number of returns from overdense trails for which the maximum amplitude is comparable to the average maximum amplitude for returns from underdense trails, and which last considerably less than a second.

As the overdense trails generally tend to last longer, they are prone to wind distortion, which creates multipath propagation and large fluctuations in the received power. Some of the returns from overdense trails could be interpreted as either a return from a wind distorted overdense trail, or as a return from a trail that did not originally fulfill the required scattering geometry, but has been repositioned by the wind after the trail was fully formed.

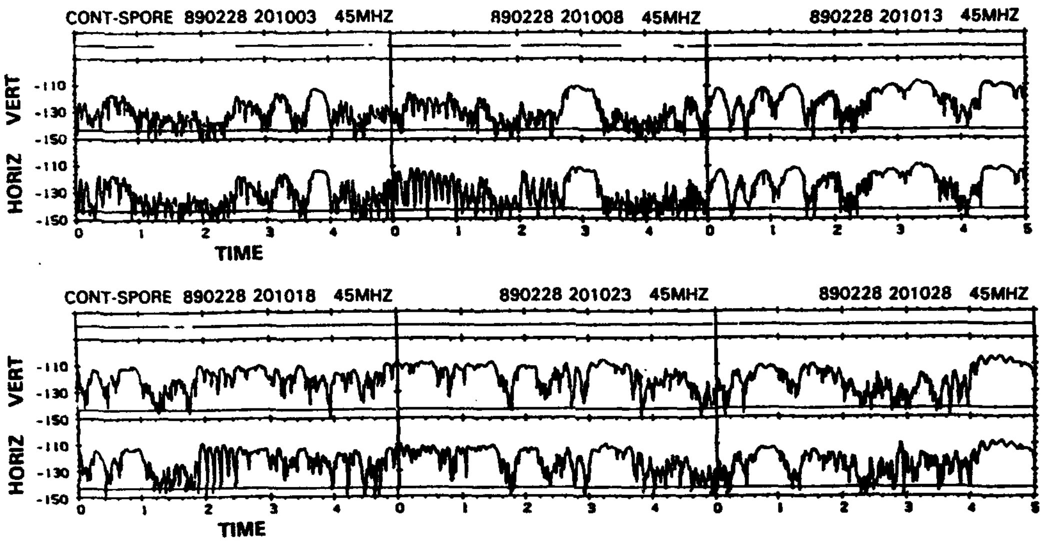


Figure 8. Examples of returns from Sporadic E-layers.

## 6.3 Returns from Sporadic E-Layers

This classification is used to account for the occurrences of very strong (up to -75 dBm), long enduring signal events which can last from a few minutes to more than 25 minutes. The signals are observed primarily at the lower frequencies (35 and 45 MHz). Examples of signals reflected from sporadic E-layers are shown in Figure 8.

These signals obviously do not originate from meteor trails, nor can they originate from the ionosphere's F-layer, as this does not reflect obliquely at VHF frequencies on a path as short as the Sondrestrom AB - Thule AB path. The logical explanation is that the signals originate from sporadic E-layers. These layers are known to occasionally have electron densities large enough to permit oblique reflections at frequencies in the lower VHF spectrum. The main characteristics of the signals, apart from their long duration, are the large amplitudes and the slow, deep fades. The fades generally exhibit a periodicity of 0.1 sec to 2 sec.

## 6.4 Unidentified Propagation

Occasionally, relatively weak, long lasting signals characterized by rapid fading, are received. These superficially fit the description of scattering from field aligned irregularities as reported by Dyce.[7] However, such scattering as a mode of propagation is not plausible for

irregularities at F-layer heights and it is very unlikely, even for irregularities at E-layer heights, due to the geographical position of Sondrestrom AB and Thule AB relative to the nearly vertical inclination of the geomagnetic field. These signals often precede sporadic E events and they may in the future be reclassified as returns from weak sporadic E-layers.

## 7. ANALYSIS OPTIONS

Information in the monthly data bases can be retrieved and processed using a menu-driven front end program which calls a subset of processing routines. The main menu is shown in Table 2. Each of the main routines offers approximately ten options that allow the user to analyze the propagation and communication properties of the channel. Consequently, statistical analysis is divided into two general categories; propagation analysis and communication analysis.

### 7.1 Propagation Analysis

Propagation statistics allow analysis of the arrival rate of trails, their duration and duty cycle and fading characteristics as a function of trail type, signal level, time of day, day and frequency. These statistics can be used to determine the effect of polar cap absorption and to calibrate physically based prediction models such as METEORLINK (SAIC) or METPRED (Signatron).

### 7.2 Communication Analysis

Communication statistics allow a user to define a system and infer its performance over the test link from actual data. Parameters that can be defined by the user are the data rate, modulation, error rate, packet structure, and signaling protocol. Users can specify either a fixed data rate system or an adaptive data rate system. Available statistics include time to deliver a message, and throughput as a function of time of day, event type (underdense, overdense or sporadic-E), frequency, data rate, packet duration, error rate and packet structure. Output of the analysis program is presented in either table form or in files that can be plotted using a number of different routines.

## 8. STATISTICAL DATA BASE

The following data base descriptions are included to provide the reader with introductory background to aid interpretation of the presentations of this report. Available data bases are:

Meteor arrivals data
Distribution of signal durations data
Underdense time constants data
Duty-cycle data
Link history data
Fading data

### 8.1 Meteor Arrivals Data Base

The number of meteor arrivals exceeding a received signal threshold is an important statistic to researchers interested in predicting how physical, link, and temporal factors affect the arrival rate of meteors. The number of meteors that exceed a signal threshold is determined for each time period as a function of signal threshold, frequency, time of day, trail type and polarization. Information in this data base can be used to observe the fluctuation in arrival rate during ionospheric disturbances such as polar cap absorption (PCA) events, to determine the frequency dependence of the arrival rate as a function of time of day or season, to observe the relationship between received signal and number of trails, to observe and analyze the cross polarization dependence as a function of time of day and season, or to determine the percentage of trails that are underdense or overdense as a function of received signal level and frequency. Arrival rates of meteor trails (meteors per minute) that satisfy the user specified signal requirements are computed by dividing the number of meteors that satisfy the signal criteria by the time that the

link was available to observe meteor trails. Available time takes into account the time the link was not observing meteors due to sporadic-E or ionospheric propagation.

Data analysis routines can combine the received signal information in the arrival data base with noise level information in the link history data base to compute the arrival rate of meteors as a function of signal-to-noise ratio (SNR). This information can be used to predict the arrival rate of meteors useful for communication. In this and all other data bases, statistics are computed as a function of received signal level in increments of 2 dBm from -140 dBm to -90 dBm covering the range of signals observed on the link.

## 8.2 Distribution of Signal Durations Data Base

The signal durations data base contains information on the durations of meteor and ionospheric signals above various received signal thresholds. Duration statistics are required to determine the average throughput and message delivery time of the channel, especially for realistic systems that transmit data in fixed length packets. It is also useful for researchers interested in predicting the distribution of meteor trail durations as a function of physical and link parameters. For each signal event within a record or sequence of records, the times relative to the start of the record that the signal exceeds and goes below the threshold is noted in a table. Since communication systems have some inherent capability to combat fades, the processing routines merge fades that are less than 40 ms in duration. Duration statistics are computed as a function of duration, received signal level, day, time of day, frequency, and trail type (underdense, overdense or ionospheric).

Information stored in this data base as a function of received signal level can be transformed by the analysis routines to a function of signal to noise ratio by combining received signal information in this data base and noise information in the link history data base. Data in this data base can be used to optimize the design of communication protocols based upon the duration of meteor trails and to add to the understanding of the contribution of overdense and underdense trails to the performance of a channel.

## 8.3 Underdense Time Constants Data Base

Underdense meteor trails are observed to decay exponentially with a time constant that is a function of trail height, link distance, trail orientation and frequency. In most work, the time constant of decay is assumed fixed for a given link, but in reality it is a random variable. Statistics of the duration and time constants are required for the generation of accurate meteor burst communication simulations. For each trail identified by the trail classifier as underdense, a minimum mean square error exponential fit to the trail is performed beginning at the maximum signal point to determine the decay constant. The statistics of the time constant are determined as a function of time of day and frequency, averaged over each month.

## 8.4 Duty-cycle Data Base

Duty cycle is the time the signal was above a threshold divided by the total number of seconds the link was active (removing time that sporadic-E was dominant when analyzing meteor trails). This statistic is computed as a function of time of day, frequency, polarization, signal level and propagation mechanism (underdense trails, overdense trails and ionospheric propagation). The relative contribution of the various mechanisms to the capacity of the channel can be evaluated.

For each meteor in a data record or sequence of data records, identified by the trail classifier, the number of seconds that the received signal level exceeds the threshold is computed and the appropriate duty cycle data slot is incremented. For records identified as ionospheric, the total duty cycle for the 5 second data record is computed and the appropriate data slot is incremented.

Information in this data base is combined with the noise information in the link history data base to determine the duty cycle as a function of signal-to-noise ratio, which is used to determine the capacity of the channel at a fixed bit error rate.

### 8.5 Link History Data Base

The link history data base archives miscellaneous information about the link from each frequency period during the day. The data base contains information on the received noise level measured during the one minute preceding each frequency interval. The noise information is combined with absolute signal level information in the other data bases to transform received signal level to signal-to-noise ratio (SNR) for communication analysis.

To determine meteor arrival rates accurately, the amount of time during each frequency interval the system was available to observe meteors is determined by logging the number of seconds during which ionospheric propagation was the dominant mechanism.

### 8.6 Fading data base

The final data base provides information about the fading of the envelope of meteor trails and ionospheric propagation events. A fade is said to occur when the signal to noise drops in excess of 3 dB below 10 dB signal-to-noise ratio, relative to the specified bandwidth and then goes back above the threshold during the life of a trail. The thresholds considered are 10 dB SNR relative to 100, 300, 600, 1200, 1600, 2400, 4800, 8000, 9600, 19200, 32000, 64000, and 128,000 Hz.

$$\text{Threshold above noise(dB)} = 10 \log(10^{([10 + 10 \log(Bw/100)]/10)} + 1).$$

The 1 takes into consideration the (S+N)/N. If the duration of the fade is greater than one second, we assume the beginning of a new event. Fades per second are computed as the number of fades per event divided by the duration of the event. For meteor trails, three statistics are computed; 1. fades per trail, 2. fades per second of event duration and 3. distribution of fade durations. For Sporadic-E, only the latter two statistics are available and meaningful.

## 9. DATA PRESENTATION AND FORMAT

The three sets of statistics plots presented in this bulletin are only a sampling of the available options outlined in Table 2, each set covers one month. The plots presented have been limited to those categorized as propagation statistics, with attention focused on the "arrival rate" and "duty cycle" as functions of signal level, signal propagation mode and link frequency. Although communication statistics are as readily obtained, they are omitted here because such data are highly system dependent so even a small "typical" sampling might overwhelm the function of this bulletin.

Arrival Rate has been defined as the number of classifiable meteor trail returns per minute exceeding a specified received signal (RSL) or signal-to-noise ratio (SNR). Duty cycle has been defined as the ratio of the accumulated time in which classifiable meteor trail returns exceed the specified RSL (or SNR) threshold, divided by the valid listening or acquisition window.

Arrival Rates and Duty Cycle are presented in Plots vs Time, RSL and SNR. These plots are presented so as to compare either mode-classification or link-frequency. The majority of plots are presented vs Time-of-Day (TOD) as averaged over the month. Other plots showing distrbutions as a function of RSL or SNR are presented as 24 hour-whole month averages. However, selected hour intervals averaged over the whole month can be made available.

Trail return "Duration" is also available as a function of all the parameters illustrated here. A small sampling of "Duration" data is included as Normal Distributions of numbers of returns vs duration of return.

Table 3. is an outline of plots by plot number, arranged in groups that include a range of screening parameters, such as Time-of-Day, RSL-threshold, propagation-mode or link-frequency. The ordinate and abscissa data are indicated as well as the compared parameters and the range of incremented screening parameters for each group.

The plots presented here were generated by an automated batch process. Consequently, the sequence of presentation and the presentation format are determined at the convenience of the software architect. These features and some of the less obvious labelling conventions are discussed below.

Most plots are presented two-to-a-page. A notation at the lower right of each includes a menu identification and a batch plot number. The plot number is referred to by the Table 3. The menu I.D. may be related to Table 2, but also includes submenu selections that are not treated here.

A "**polarization = horizontal**" notation appears with plots no. 1-66. All data presented in this bulletin are based on signals received on horizontally polarized receiving antennas. The PL/GP database and analysis software includes the option to present vertically polarized reception from the horizontally polarized transmissions.

A "**maximum downtime due to sporadic-E = 240 secs.**" notation appears with plots no. 1-30. This refers to the default convention to delete from analysis that data acquired in any bi-hourly acquisition window which included more than 240 seconds of returns classified as sporadic-E. The reader will notice a significant impact on plots presenting data at 35 and 45 MHz. since $E_s$ propagation may frequently dominate at polar cap latitudes.

A "**based on observed noise measurements = vertical**" notation appears with plots 28-30, 61-66, 94-97, 115 and 116. Several sources of noise measurement data are available. Noise measurements are made at each transmitting frequency transition from both horizontally and vertically polarized receiving antennas and, in addition, each trail record is processed to extract an apparent noise level which is averaged over the acquisition window. The default noise reference is measured from the vertically polarized receiving antennas.

A "**effective system bandwidth = 100 Hz.**" notation appears with plots 28-30, 61-66 and 94-97. This is a trivial reference to the system effective noise bandwidth.

Plots 67-87, 94, 95, 100-106 and 108-114 are normalized distributions of trail return durations, or decay time-constants. The "**normalizing factors**" indicate the extent of data available for each mode.

## 10. SUPPLEMENTARY INFORMATION

To aid interpretation, selected supplementary data are included in Plots 117 through 123. These data are indicators of ionospheric disturbances that can significantly degrade radio propagation. The magnitude of the polar magnetic field, as recorded on a three-axis fluxgate magnetometer, and riometer data from two 30 MHz units, are recorded at one-minute intervals by instruments operated by Phillips Laboratory at Thule Air Base in Greenland. This includes two riometers and a three axis magnetometer located near the Test Bed receiver. A full description of

the instruments and the data produced is in preparation and will be referenced in future bulletin issues.

### 10.1 Ionospheric Disturbances

The polar ionosphere is a turbulent region, subject to a range of disturbances primarily related to solar activity. When such disturbances occur they may distort the monthly average statistics, depending on the duration and severity of the events. Such disturbance events will appear as extraordinary absorption, noise, or both. Typical disturbance events are discussed below.

### 10.2 Absorption Events

During absorption events two propagation effects can occur. One is the attenuation of the signal traversing the absorbing region; the other is depolarization. However, although polarization data are collected by the HLMSTB, depolarization analysis is not included in this bulletin series.

Two types of absorption can be encountered: Polar Cap Absorption (PCA), affecting signals penetrating the D-region inside the polar cap, and auroral absorption, mainly confined to paths penetrating the upper D-and lower E-regions of the ionosphere in the auroral oval. PCA events cover the entire polar cap with a blanket of additional D-region absorption. The magnitude of this absorption as measured by a 30 MHz riometer at zenith can exceed 10 dB.

PCA's can last days, or even weeks in severe cases. Auroral absorption events tend to be patchy, last for a few hours, and produce 30 MHz riometer absorption values of up to 2-3 dB as measured towards zenith. These absorption events will affect the received signals and the system noise differently. The magnitude of the absorption decreases with an increase of the elevation angle of the propagation path and with an increase in the frequency of operation. The received meteor signals traverse the absorbing region twice, generally at a low elevation angle. The noise of Galactic origin traverses the absorption region only once, and at a range of elevation angles dependent on the extent of the antenna radiation pattern. As a consequence, the noise is absorbed significantly less than the meteor signal. A comprehensive treatment of absorption effects on meteor scatter propagation, illustrated with examples from the PL Greenland links is given in Ostergaard et.al.[8,9]

### 10.3 Noise Events

Noise events are not as common as absorption events and whereas the effects of absorption events are a function of frequency, solar noise tends to be broadband and affects all frequencies across the VHF spectrum. These events can result in an increase in received noise of 10's of dB; however, the effects are seen only when the sun is visible to the antenna. Such noise events can last for several days.

### 10.4 Disturbance Events During the Reporting Period

Although the effects of two significant periods of solar disturbance were observed in this bulletin period, there was no obvious distortion of the calculated monthly averages. The two event periods noted are as follows:

11-15 March - combined absorption and noise events
10-15 April - absorption event

These periods appear to correlate with Solar Proton Events (SPE) resulting from eruptions of solar flares (NOAA Solar-Geophysical Data reports;* regions 5395 and 5441). A third, very brief event, also probably associated with region 5395 17-18 March, shows negligible impact on meteor scatter statistics and is not discussed beyond its identification. Major eruptions, reported as X-ray events rated X3.6 to X6.5, occurred on 10, 16 and 17 March in region 5395 and in region 5441 on 9 April. GOES-7 proton flux measurements show convincing correlation with absorption events seen in plots 117 and 119.

A 30 MHz. riometer output is displayed in plot 117 and plot 119 presents the calculated absorption. This riometer is located at Thule AB, Greenland, near the meteor scatter receiver. The PCA's of March and April are clearly indicated in riometer plots 117 and 119 for each month. (In this issue, the plots 118 and 120 referred to above, are omitted because of one instruments malfunction.)

Absorption and solar noise effects on meteor scatter may be most readily seen in plots 25 through 27, 30 (Arrivals vs. DOM); and 55 through 57, 65 and 66 (Duty Cycle vs. DOM) for each month. Plot 116, (Noise temperature vs. DOM) clearly indicates the PCA effect of the April event on observable galactic noise. However, the effects of the March absorption event are obscured by high levels of solar noise, probably attributable to the same sunspot as suggested by solar radio emissions at frequencies under 100 MHz., reported in Solar Geophysical Data reports.

The March PCA event exceeded 1 dB absorption at 30 MHz from 1800 on the 11th through the 13th. It further exceeded 6 dB from 1200 to 2400 of the 12th, and peaked near 8 dB at 1800 UT. The absorption effects on meteor scatter propagation are normally observable in plots 25 and 26 as dips in the 45 MHz. Arrival Rate. However, other phenomena of interest are clearly seen in plot 116 where high noise intervals are seen at all test frequencies. These are probably direct observations of the solar surface by the receiver antenna. This accounts for dips in Arrival Rate at both 45 and 104 MHz. throughout the 11-15 March interval in plots 25, 26, 30, 65 and 66. Data gaps in plots on 19 and 23 March may be attributable to equipment problems as reflected in plot 115. A treatment of this event can be found in reference 8 and 9.

The April event exceeded 1 dB absorption, at 30 MHz, from late 10 through 13 April. Dips in Arrival Rate and Duty Cycle, as well as some enhanced fluctuation throughout each day, are especially apparent in plots 25, 26, 30, 65 and 66. No effects are obvious at 104 MHz. Enhanced 104 MHz. fluctuations later in the month are unaccounted for.

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*Solar-Geophysical Data reports obtainable from; NOAA/NESDIS,E/GC2, 325 Broadway, Boulder CO 80303.

**Table 3. Outline of plot groups by Plot No., showing Ordinate and Ascissa data and the group screening parameters.**

---

**PLOTS # 1-18**
ARRIVAL RATE (M/MIN) vs. Time-Of-Day (UT)
Comparing propagation modes; Underdense, Overdense and All-Trails.
Screening parameters; RSL threshold -126, -116, -106 dBm and Link frequencies 35, 45, 65, 85, 104 and 147 MHz.

**PLOTS # 19-24**
ARRIVAL RATE (M/MIN) vs. Threshold RSL in dBm
Comparing propagation modes; Underdense, Overdense and All-Trails.
Screening parameters; Link frequencies 35, 45, 65, 85, 104 and 147 MHz. averaged over 24 hours.

**PLOTS # 25-27**
ARRIVAL RATE (M/MIN) vs. DAY/Time-Of-Day (UT)
Comparing link Frequencies; 45 and 104 MHz.
Screening parameters; RSL threshold -126, -116, -106 dBm

**PLOT # 28**
ARRIVAL RATE (M/MIN) vs. Time Of Day (UT)
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.
Screening parameters; All trails, 19 dB SNR threshold.

**PLOT # 29**
ARRIVAL RATE (M/MIN) vs. Threshold SNR *in dB*
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.
Screening parameters; All trails, 24 hour average.

**PLOT # 30**
ARRIVAL RATE (M/MIN) vs. DAY/Time Of Day (UT)
Comparing link Frequencies; 45 and 104 MHz.
Screening parameters; All trails, 19 dB SNR threshold.

**PLOTS # 31-36**
DUTY CYCLE ABOVE RSL (percent) vs. Threshold RSL in dBm
Comparing propagation modes; Underdense, Overdense & All Trails, also Sporadic E and All Events.
Screening parameters; Link frequencies 35, 45, 65, 85, 104 and 147 MHz. averaged over 24 hours.

**PLOTS # 37-54**
DUTY CYCLE ABOVE RSL (percent) vs. Time-Of-Day (UT)
Comparing propagation modes; Underdense, Overdense & All Trails, also Sporadic E and All Events.
Screening parameters; RSL threshold -126, -116, -106 dBm and Link frequencies 35, 45, 65, 85, 104 and 147 MHz.

**Table 3. Outline of plot groups; continued.**

**PLOTS # 55-57**
DUTY CYCLE ABOVE RSL (percent) vs. DAY/Time-Of-Day (UT)
Comparing link Frequencies; 45 and 104 MHz.
Screening parameters; RSL threshold -126, -116, -106 dBm, for All Trails.

**PLOTS # 58-60**
DUTY CYCLE ABOVE RSL (percent) vs. DAY/Time-Of-Day (UT)
Comparing link Frequencies; 45 and 104 MHz.
Screening parameters; RSL threshold -126, -116, -106 dBm, for Sporadic E-layers only.

**PLOTS # 61,62**
DUTY CYCLE ABOVE SNR (percent) vs. SNR (dB)
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.
Screening parameters; All-Trails and All-Events including Sporadic E-layers, 24 hour average.

**PLOTS # 63,64**
DUTY CYCLE ABOVE SNR (percent) vs. Time-Of-Day (UT)
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.
Screening parameters; All Trails and All-Events including Sporadic E-layers, 19 dB SNR threshold.

**PLOTS # 65,66**
DUTY CYCLE ABOVE SNR (percent) vs. DAY/Time-Of-Day (UT)
Comparing link Frequencies; 45 and 104 MHz.
Screening parameters; All Trails and All-Events including Sporadic E-layers, 19 dB SNR threshold.

**PLOTS # 67-84**
NORMAL DISTRIBUTION vs. DURATION
Comparing propagation modes; Underdense, Overdense and All-Trails, also sporadic-E and All-Events.
Screening parameters; RSL threshold -126, -116, -106 dBm and Link frequencies 35, 45, 65, 85, 104 and 147 MHz.

**PLOTS # 85-87**
NORMAL DISTRIBUTION vs. DURATION
Comparing link Frequencys; 35, 45, 65, 85, 104 & 147 MHz.
Screening parameters; RSL threshold -126, -116, -106 dBm, for All Trails.

**PLOTS # 88-93**
AVERAGE TRAIL DURATION vs. RSL
Comparing propagation modes; Underdense, Overdense and All Trails, also Sporadic E and All Events.
Screening parameters; Link frequencies 35, 45, 65, 85, 104 and 147 MHz. averaged over 24 hours.

**Table 3. Outline of plot groups; continued.**

**PLOTS # 94,95**
NORMAL DISTRIBUTION vs. DURATION
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.
Screening parameters; 24 hour average, 19 dB SNR threshold, for All-Trails and All-Events including Sporadic E-layers.

**PLOTS # 96,97**
AVERAGE TRAIL DURATION vs. SNR
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.
Screening parameters; All trails, 24 hour average.

**PLOT # 98**
NORMAL DISTRIBUTION, UNDERDENSE DECAY CONSTANTS
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.
24 hour average.

**PLOT # 99**
AVERAGE UNDERDENSE DECAY CONSTANT vs. Time-Of-Day (UT)
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.

**PLOT # 100**
NORMAL DISTRIBUTION, FADES/SEC
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.
Screening parameters; All trails, 24 hour average.

**PLOTS # 101-106**
NORMAL DISTRIBUTION, FADES/SEC
Comparing propagation modes; Underdense, Overdense and All Trails, also Sporadic E and All Events.
Screening parameters; Link frequencies 35, 45, 65, 85, 104 and 147 MHz. averaged over 24 hours.

**PLOT # 107**
AVERAGE FADES/SEC. vs. Time-Of-Day (UT)
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.
All trails.

**PLOT # 108**
NORMAL DISTRIBUTION, FADE DURATIONS
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.
Screening parameters; All trails, 24 hour average.

**PLOTS # 109-114**
NORMAL DISTRIBUTION, FADE DURATIONS
Comparing propagation modes; Underdense, Overdense and All Trails, also Sporadic E and All Events.
Screening parameters; Link frequencies 35, 45, 65, 85, 104 and 147 MHz. averaged over 24 hours.

**Table 3.** Outline of plot groups; continued.

**PLOT # 115**
LINK-UP PER CENT vs. DAY/Time-Of-Day (UT)
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.

**PLOT # 116**
NOISE-TEMPERATURE (Kelvin) vs. DAY/Time-Of-Day (UT)
Comparing link Frequencies; 35, 45, 65, 85, 104 & 147 MHz.

**PLOTS # 117-120**
30 MHz RIOMETER DATA vs. DAY/Time-Of-Day
Two riometers are maintained at Thule AB. Direct riometer receiver outputs in volts show the diurnal variation in absorption thoughout the month. Riometer absorption data in dB with the quiet day diurnal variation removed will also be included.

**PLOTS # 121-123**
3-AXIS MAGNETOMETER vs. DAY/Time-Of-Day. Data from a 3-axis fluxgate magnetometer at Thule AB. The X axis is aligned with magnetic-North pole.

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2. Weitzen, J.A., A data base approach to analysis of meteor burst data, Radio Science, Vol. 22, No. 1, pp 133-140, January-February 1987.

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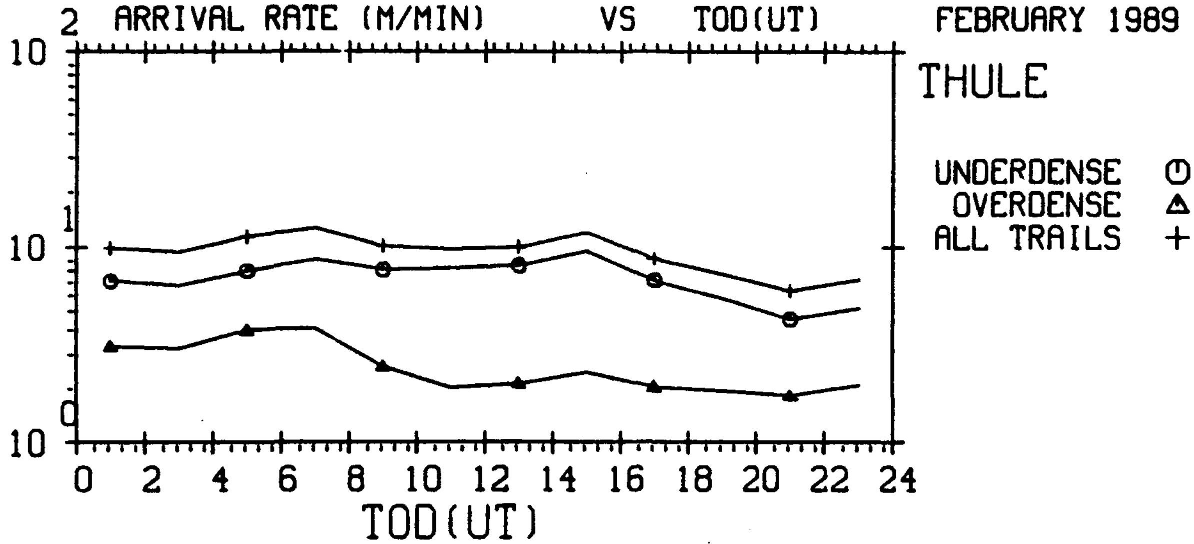
# APPENDIX A

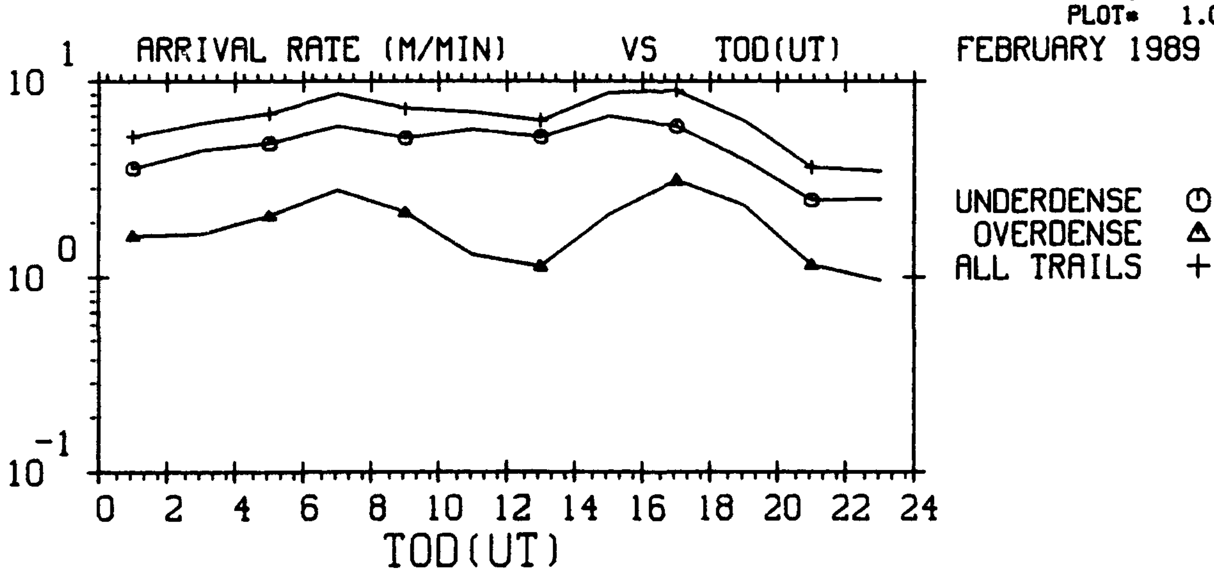
## STATISTICS FOR FEBRUARY 1989

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

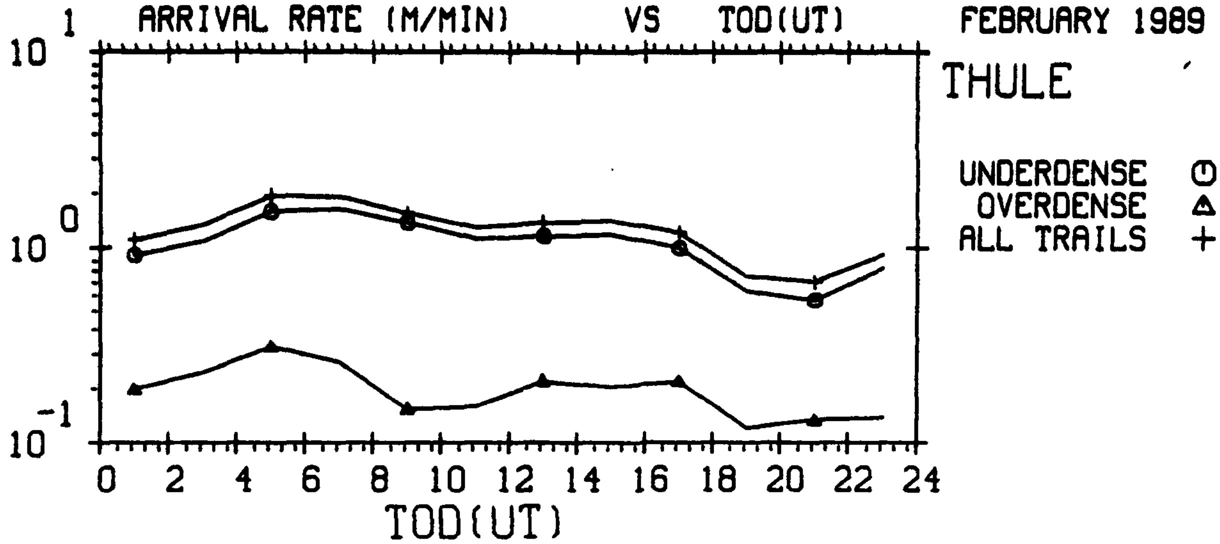
MENU=101,05-2
20-SEP-90
PLOT= 1.00




EXCEEDING -126.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

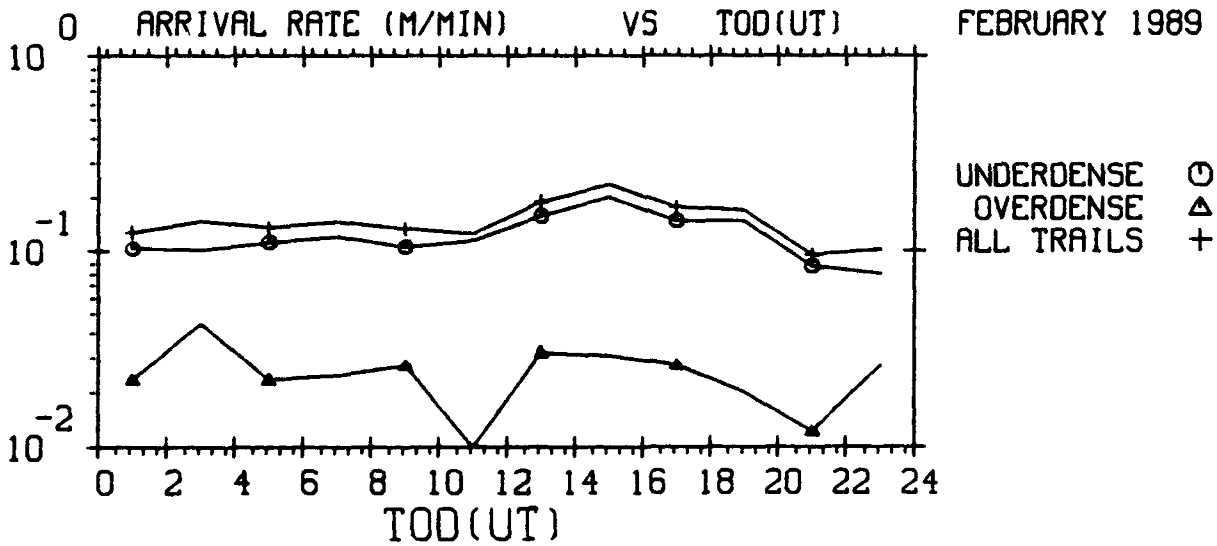
MENU=101,05-2
20-SEP-90
PLOT= 2.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

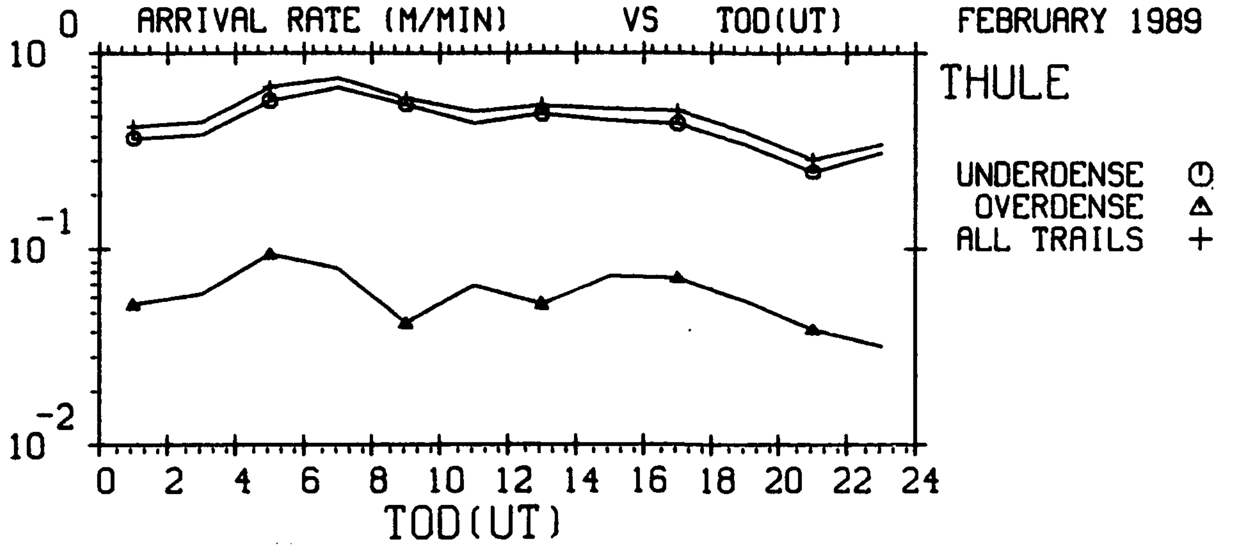
MENU*101,05-2
20-SEP-90
PLOT* 3.00




EXCEEDING -126.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

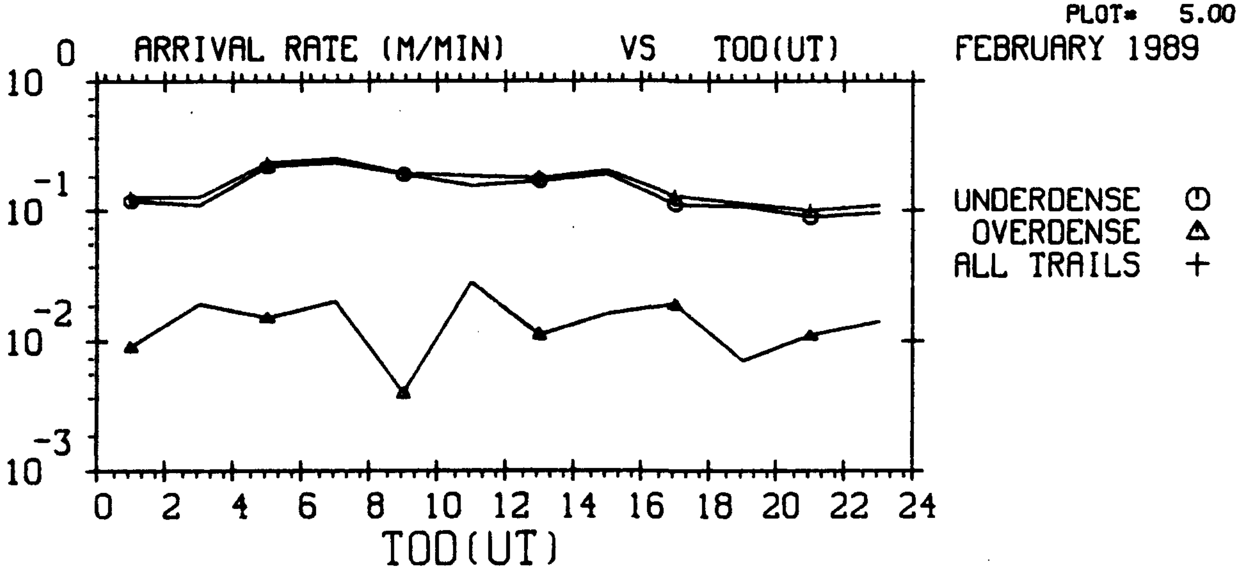
MENU*101,05-2
20-SEP-90
PLOT* 4.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

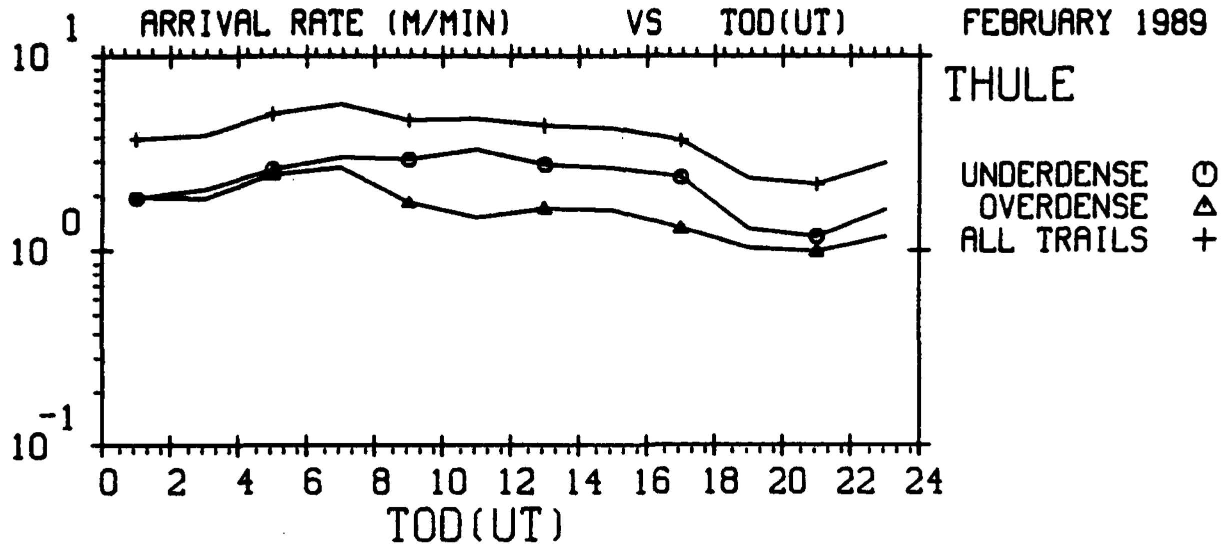
MENU*101,05-2
20-SEP-90
PLOT* 5.00




EXCEEDING -126.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

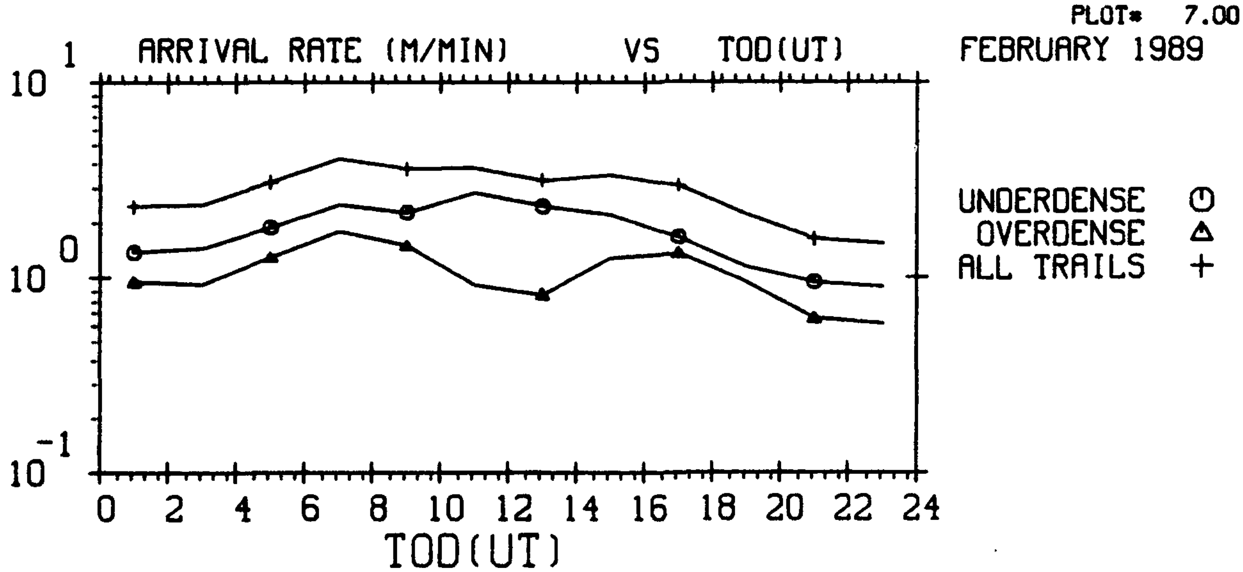
MENU*101,05-2
20-SEP-90
PLOT* 6.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

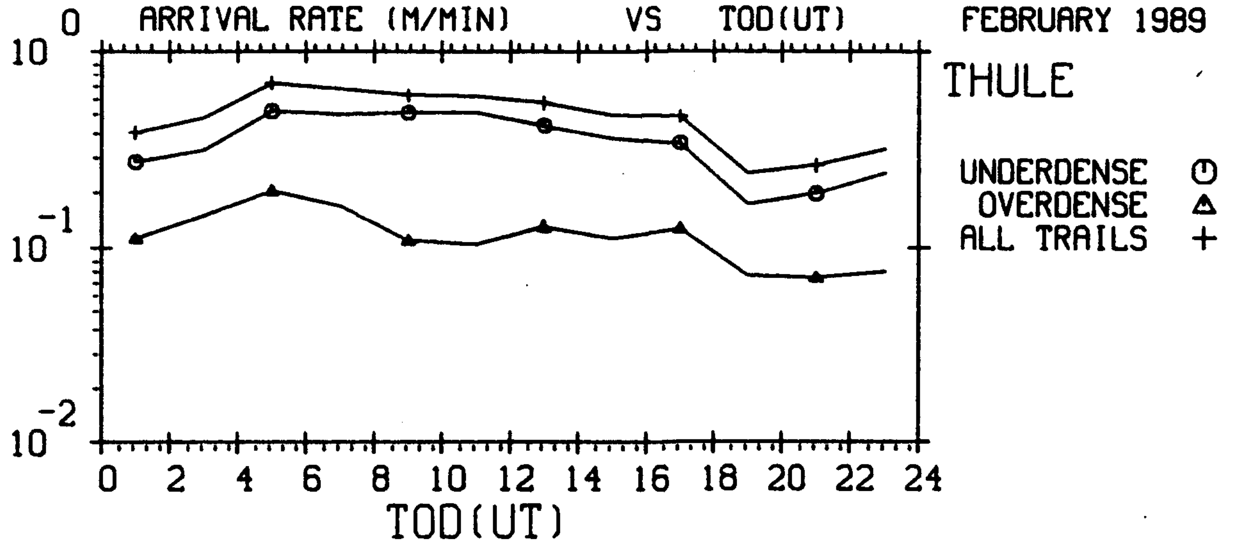
MENU=101,05-2
20-SEP-90
PLOT= 7.00




EXCEEDING -116.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

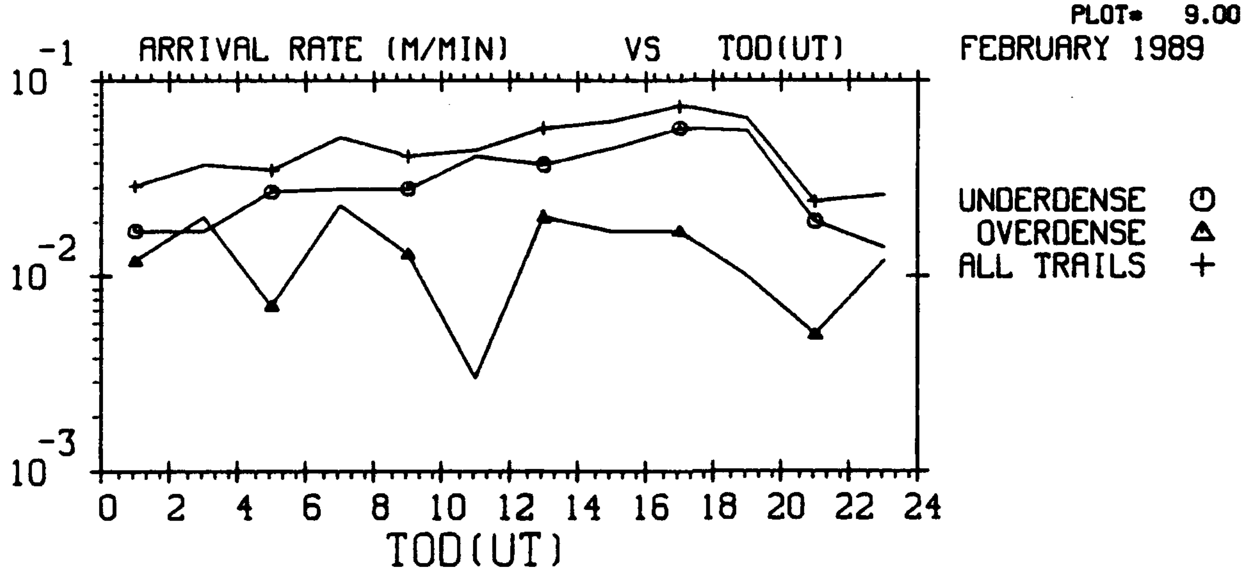
MENU=101,05-2
20-SEP-90
PLOT= 8.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

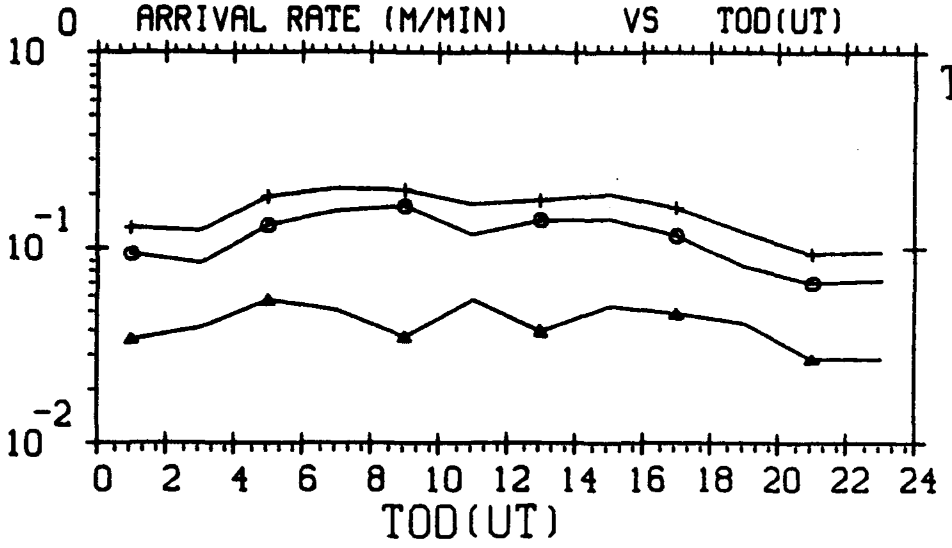
MENU=101,05-2
20-SEP-90
PLOT= 9.00




EXCEEDING -116.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

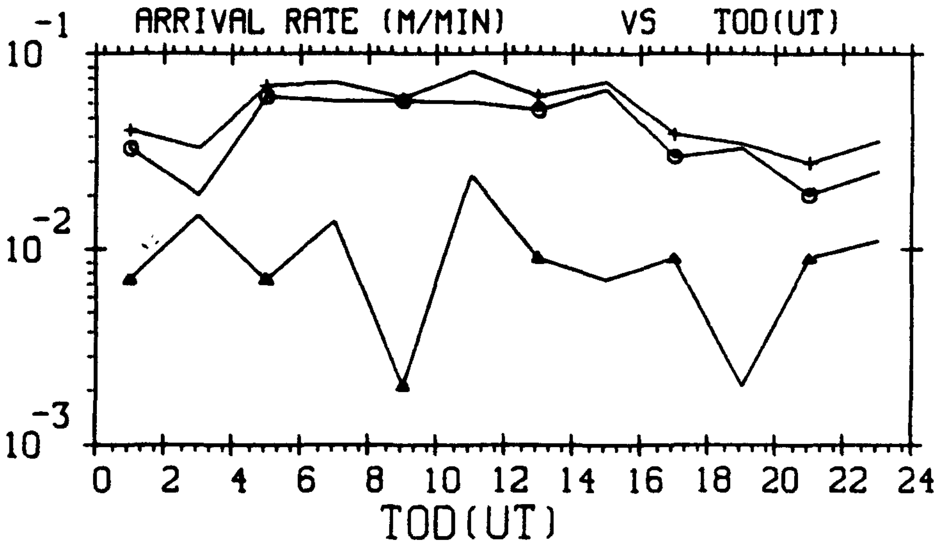
MENU=101,05-2
20-SEP-90
PLOT= 10.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

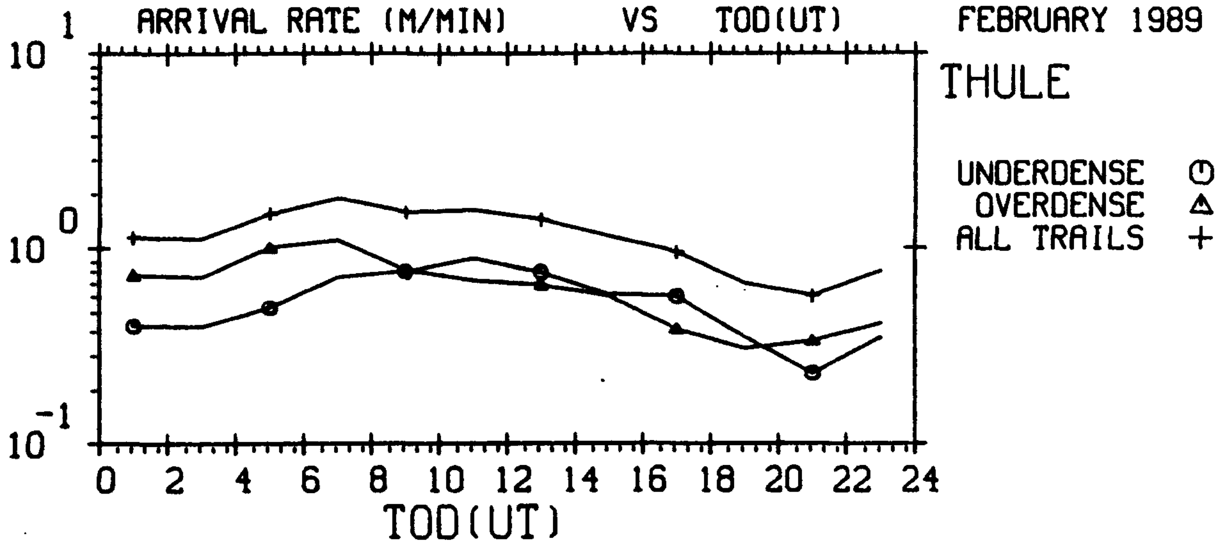
MENU=101,05-2
20-SEP-90
PLOT= 11.00




EXCEEDING -116.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

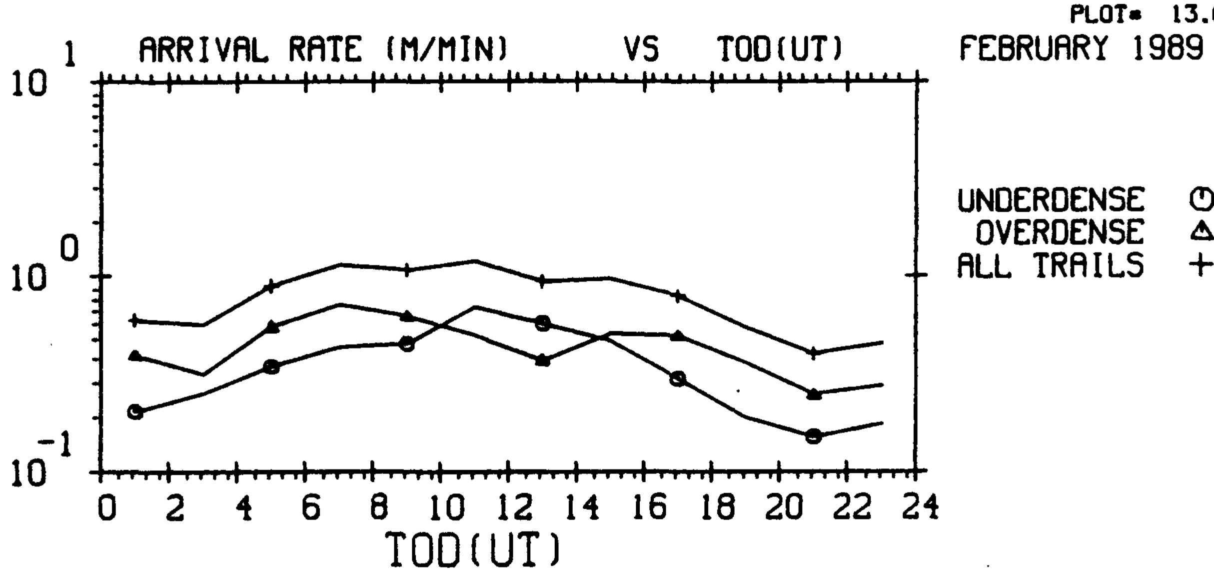
MENU=101,05-2
20-SEP-90
PLOT= 12.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

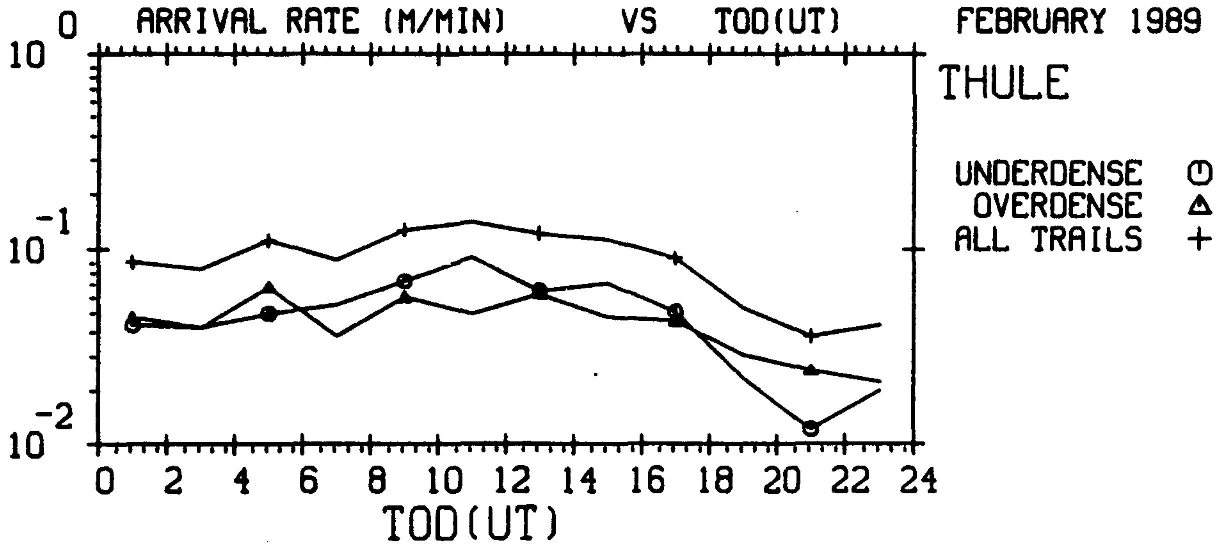
MENU=101,05-2
20-SEP-90
PLOT= 13.00




EXCEEDING -106.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

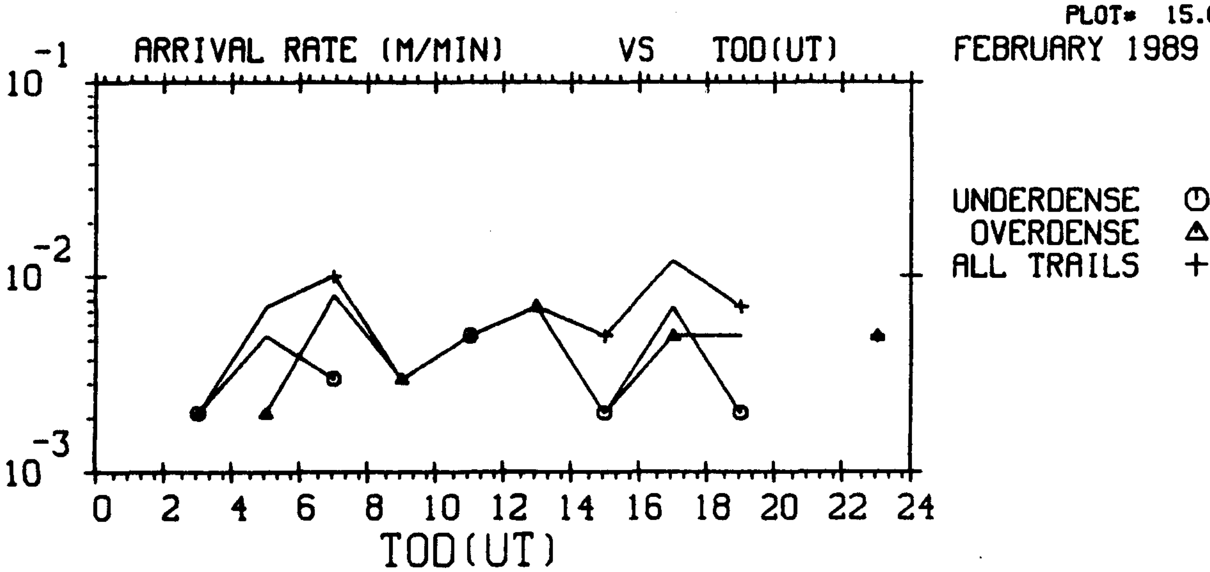
MENU=101,05-2
20-SEP-90
PLOT= 14.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

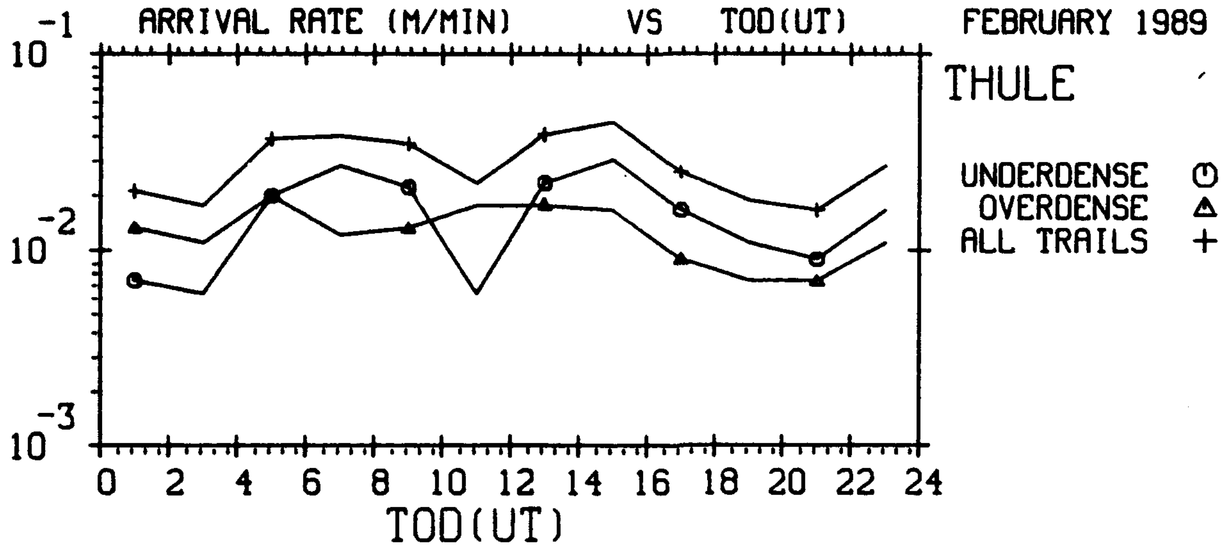
MENU*101,05-2
20-SEP-90
PLOT* 15.00




EXCEEDING -106.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

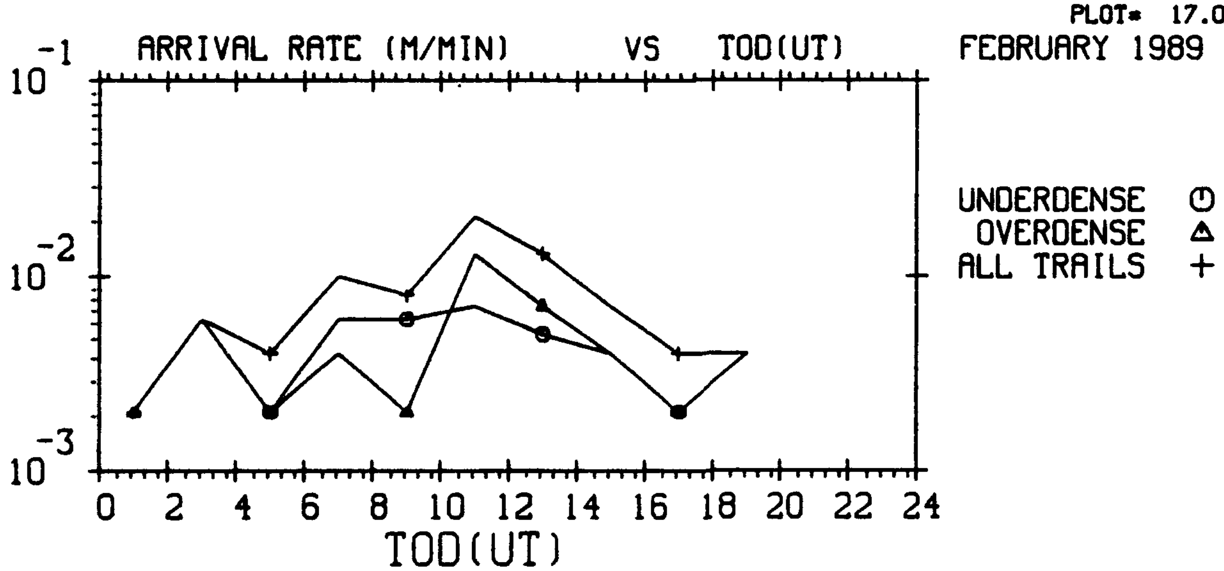
MENU*101,05-2
20-SEP-90
PLOT* 16.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING −106.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

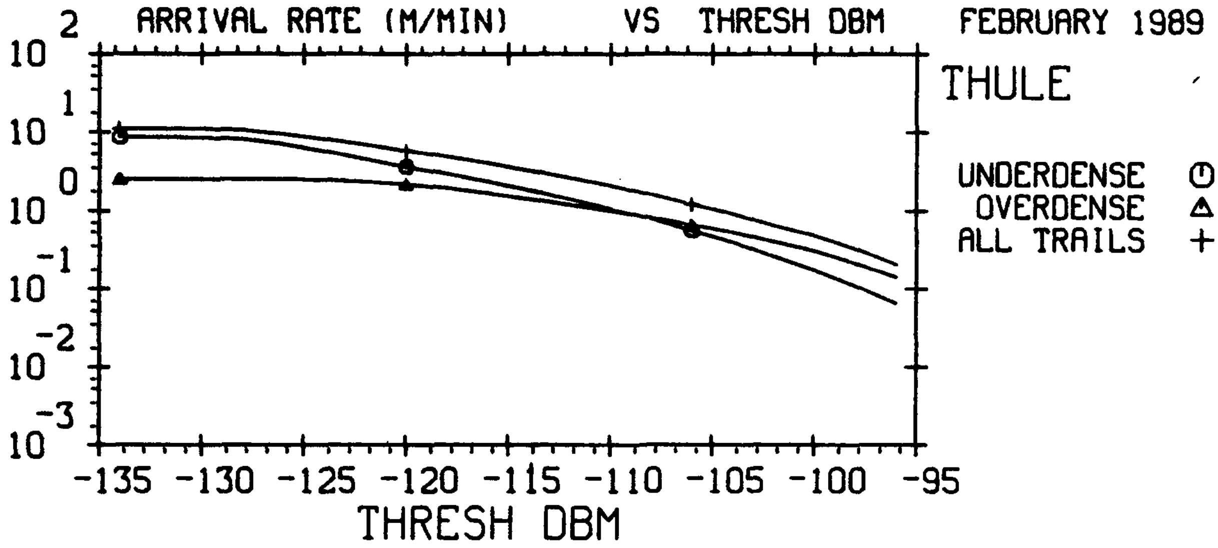
MENU=101,05-2
20-SEP-90
PLOT= 17.00




EXCEEDING −106.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

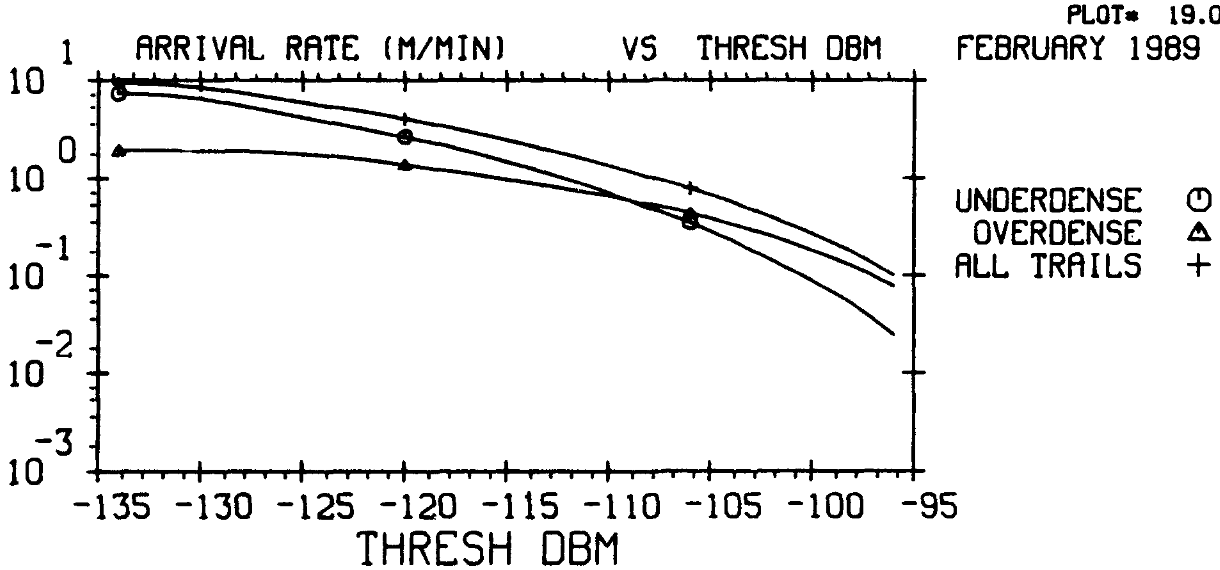
MENU=101,05-2
20-SEP-90
PLOT= 18.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

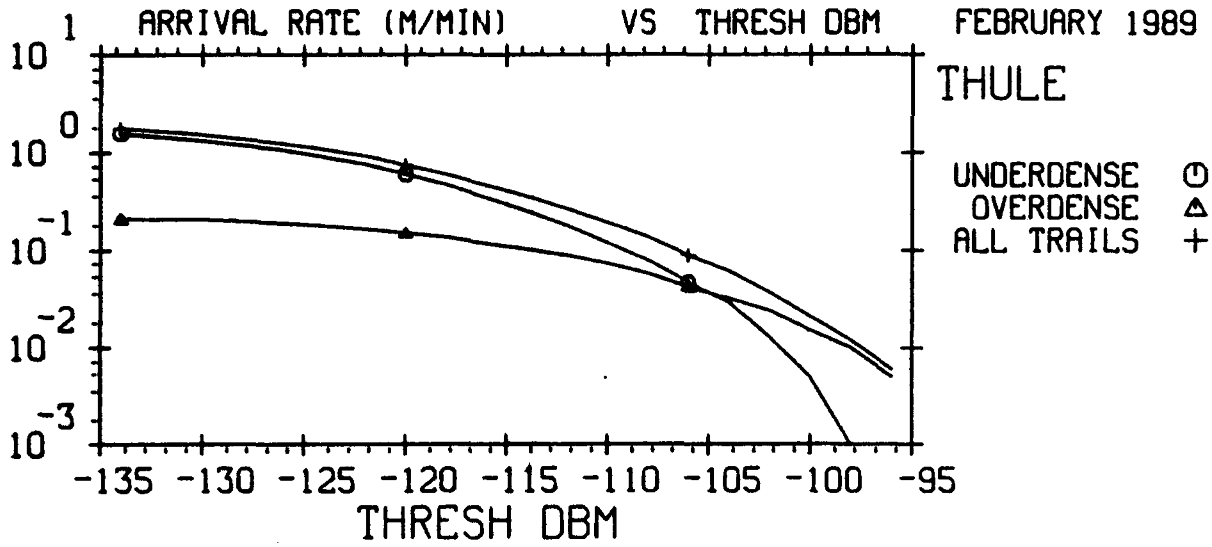
MENU=101,06-2
20-SEP-90
PLOT= 19.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

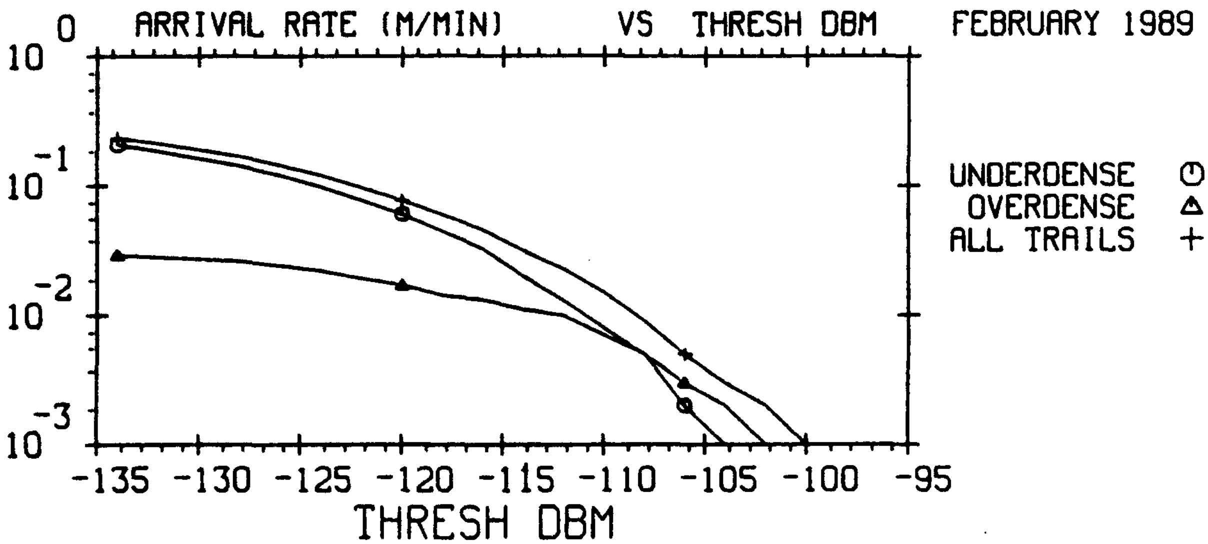
MENU=101,06-2
20-SEP-90
PLOT= 20.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

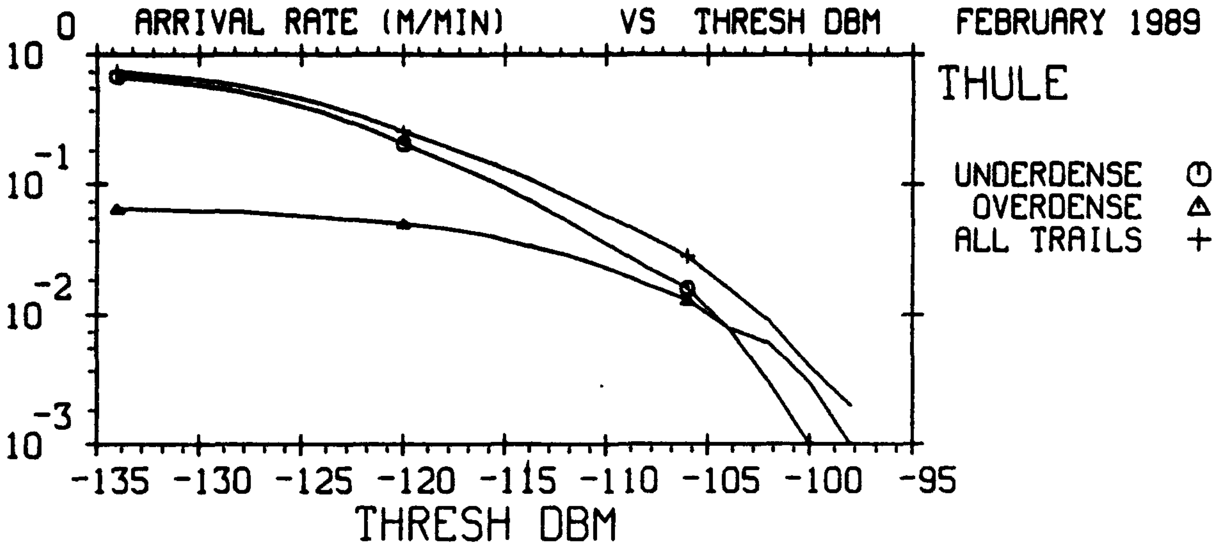
MENU*101,06-2
20-SEP-90
PLOT* 21.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

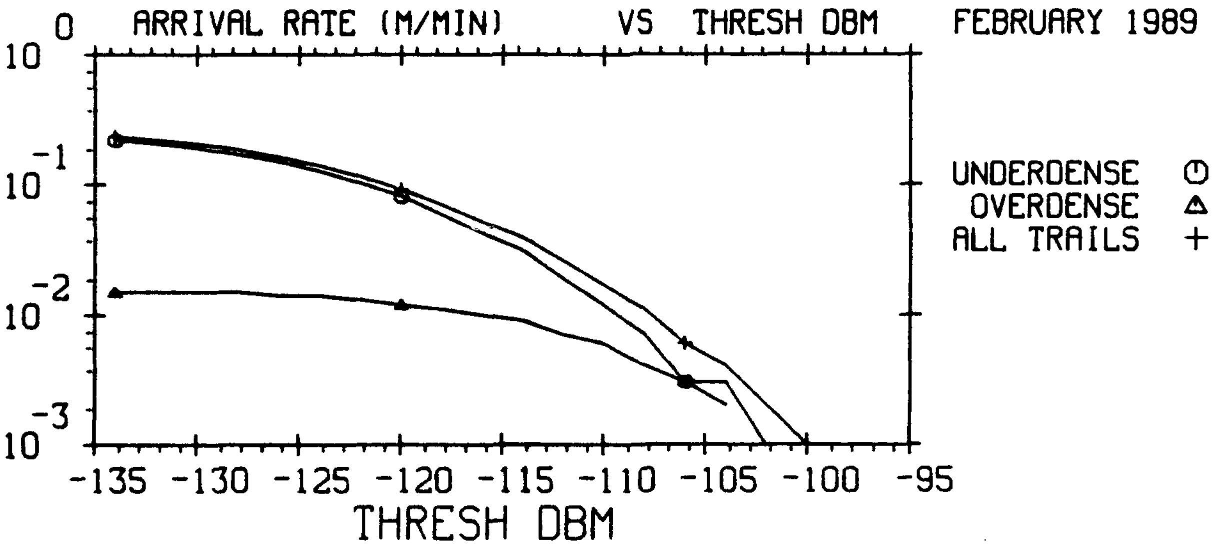
MENU*101,06-2
20-SEP-90
PLOT* 22.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

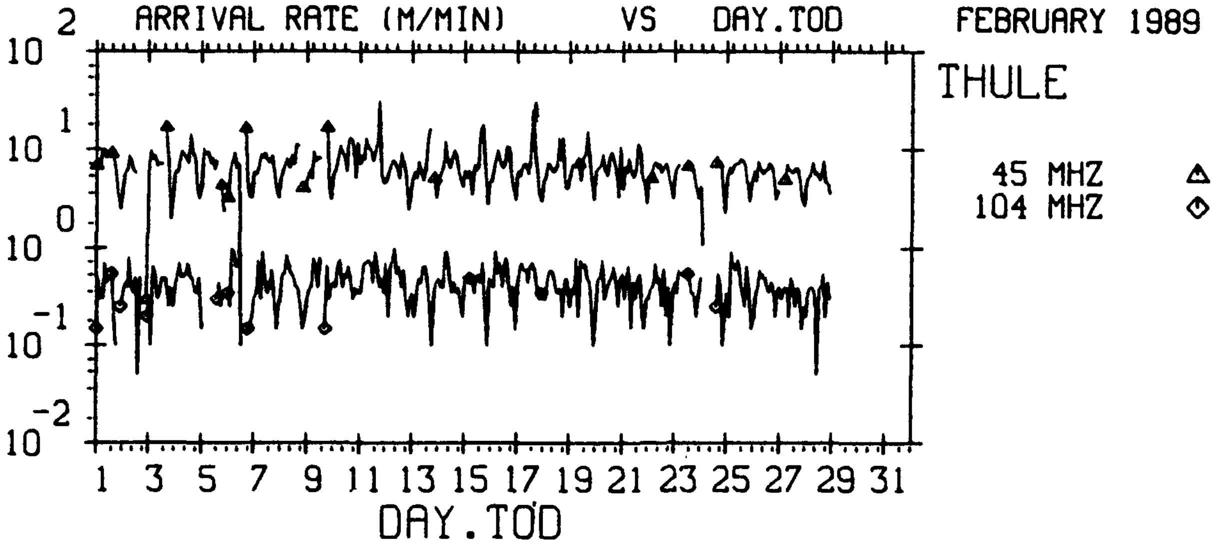
MENU=101,06-2
20-SEP-90
PLOT= 23.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

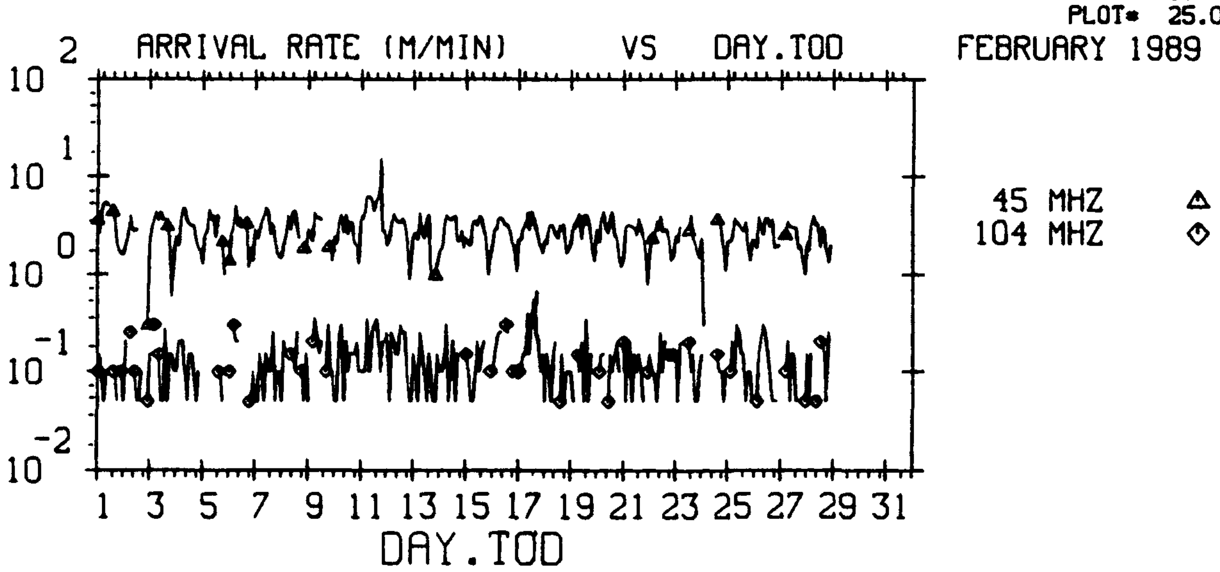
MENU=101,06-2
20-SEP-90
PLOT= 24.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

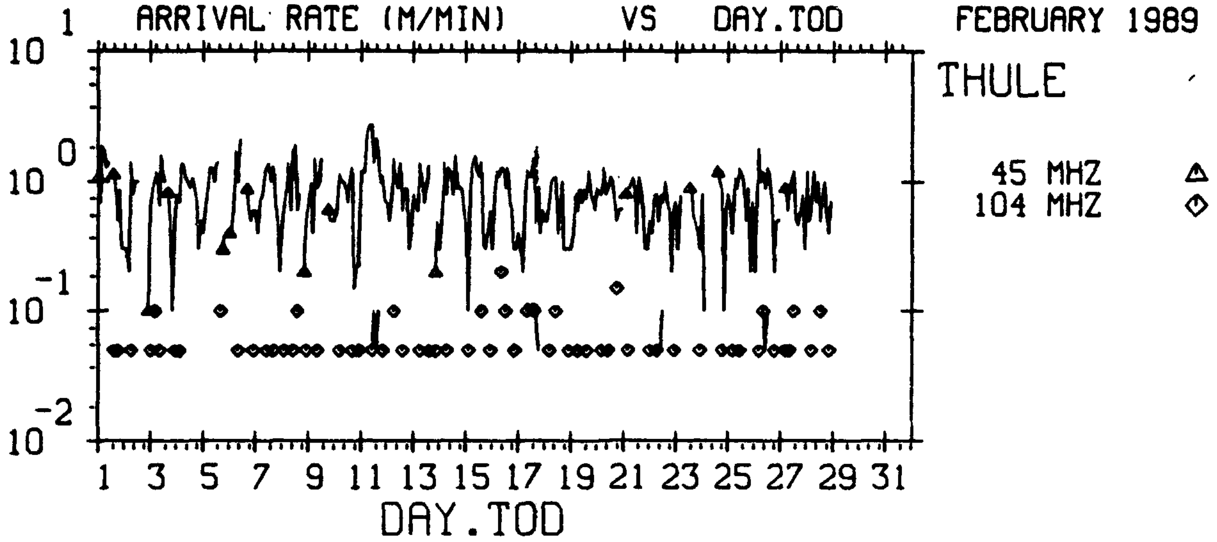
MENU*101,03-2
20-SEP-90
PLOT* 25.00




EXCEEDING -116.0 DBM RSL
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

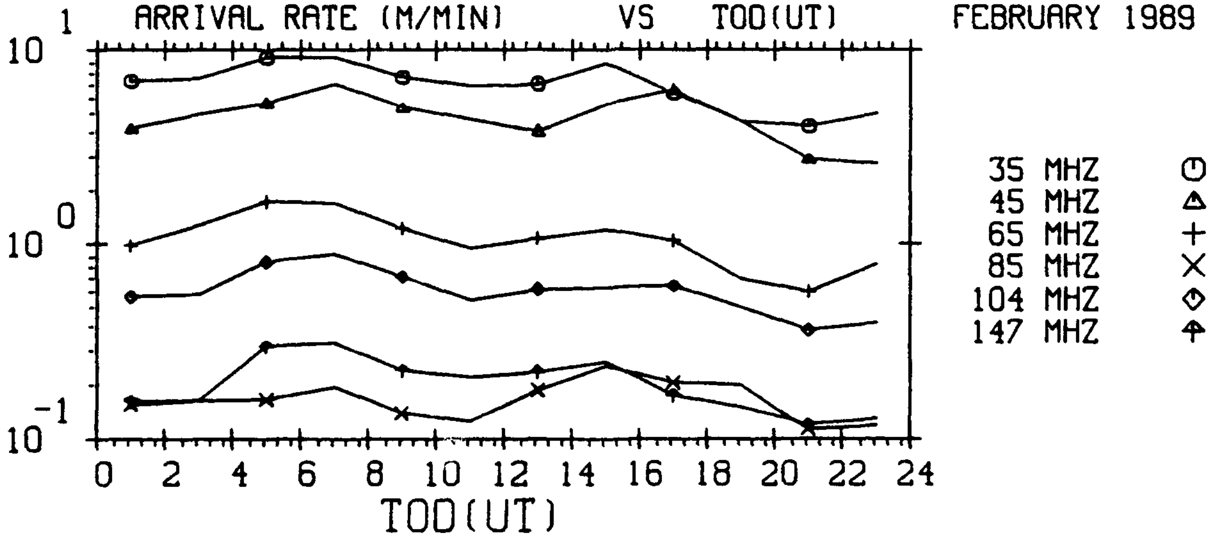
MENU*101,03-2
20-SEP-90
PLOT* 26.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

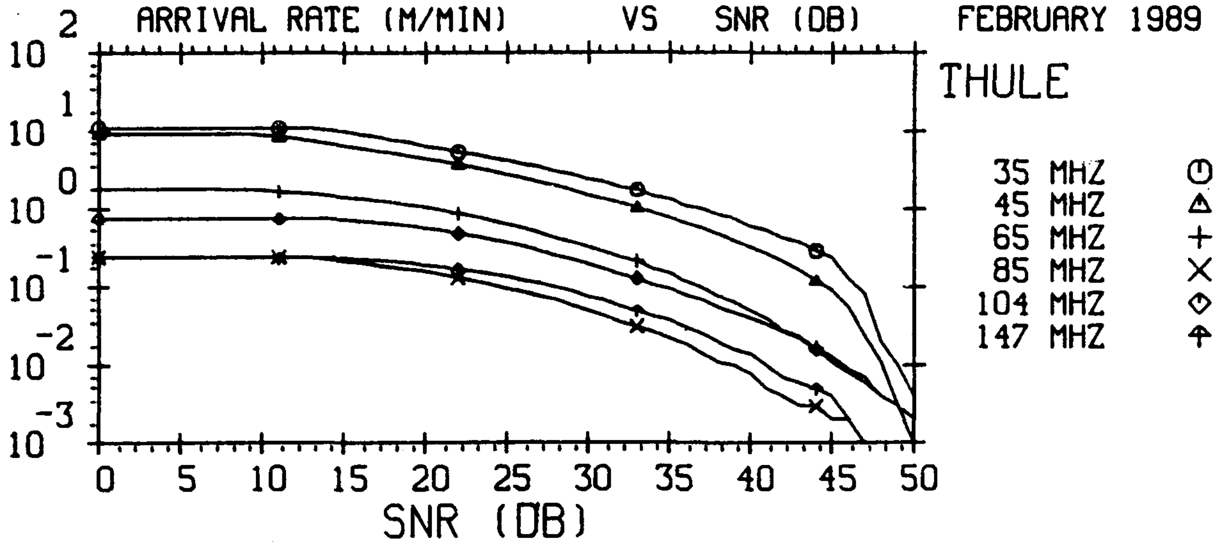
MENU=101,03-2
20-SEP-90
PLOT= 27.00




EXCEEDING 19.0 DB SNR
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

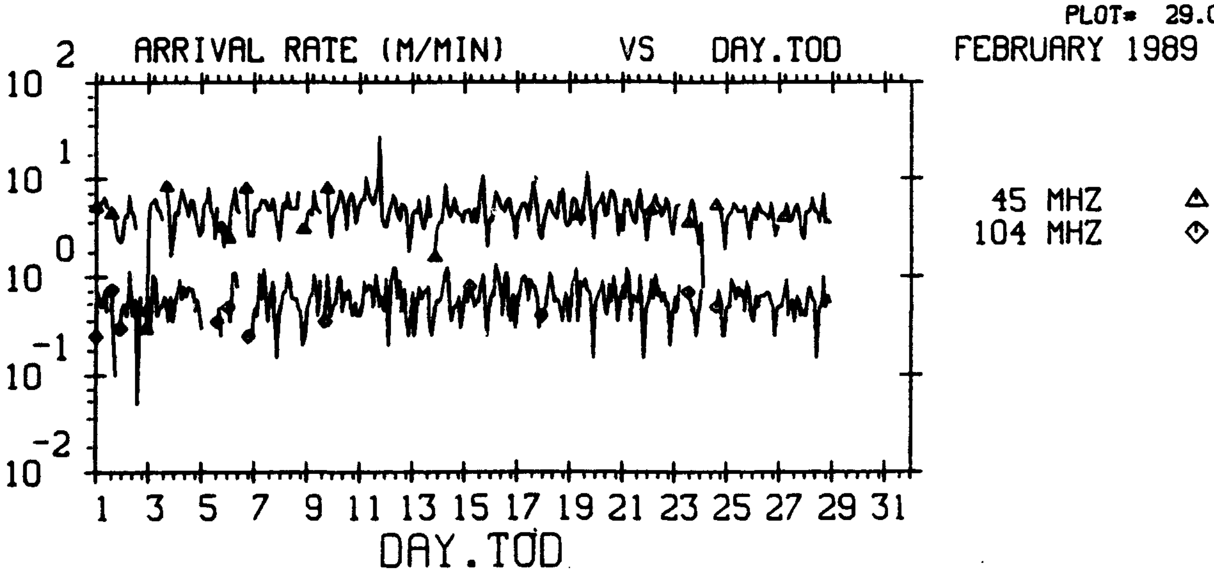
MENU=102,01-2
20-SEP-90
PLOT= 28.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

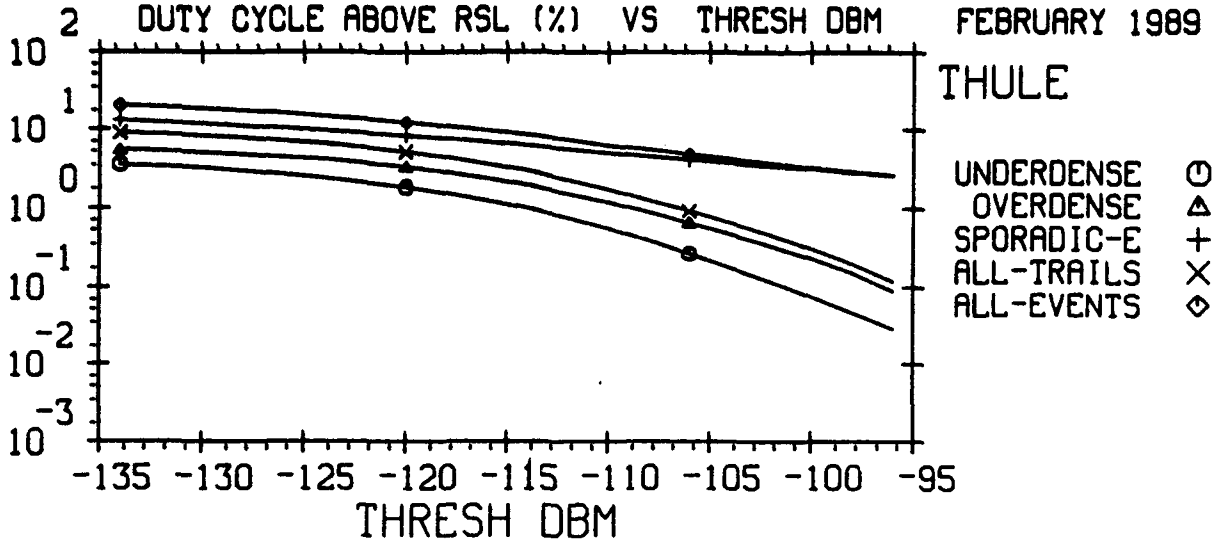
MENU*102,02-2
20-SEP-90
PLOT* 29.00




EXCEEDING 19.0 DB SNR
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

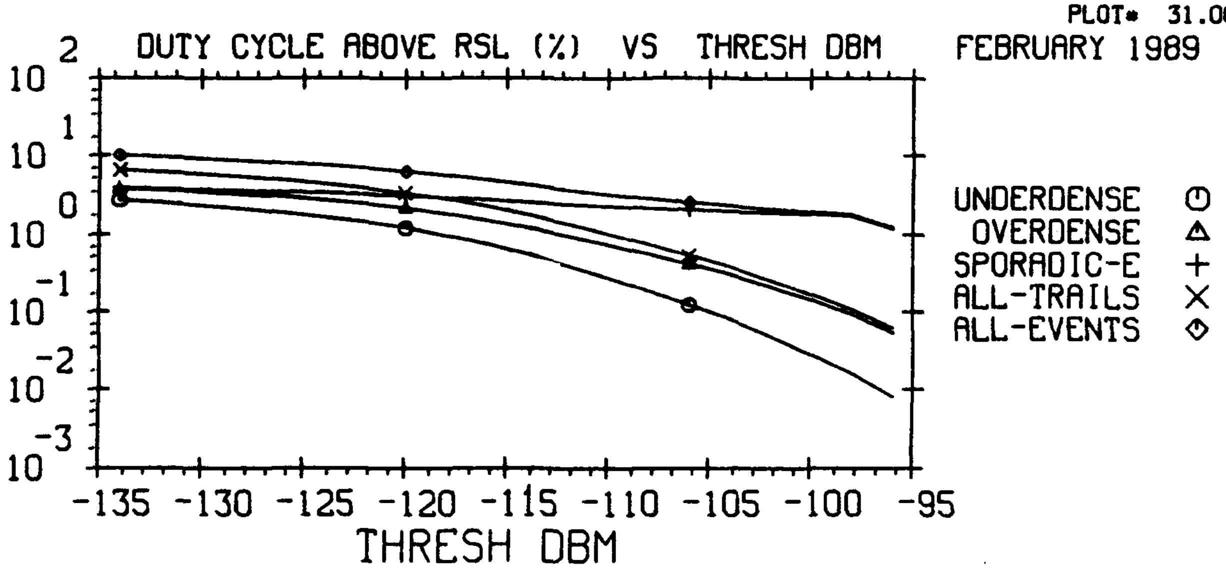
MENU*102,03-2
20-SEP-90
PLOT* 30.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

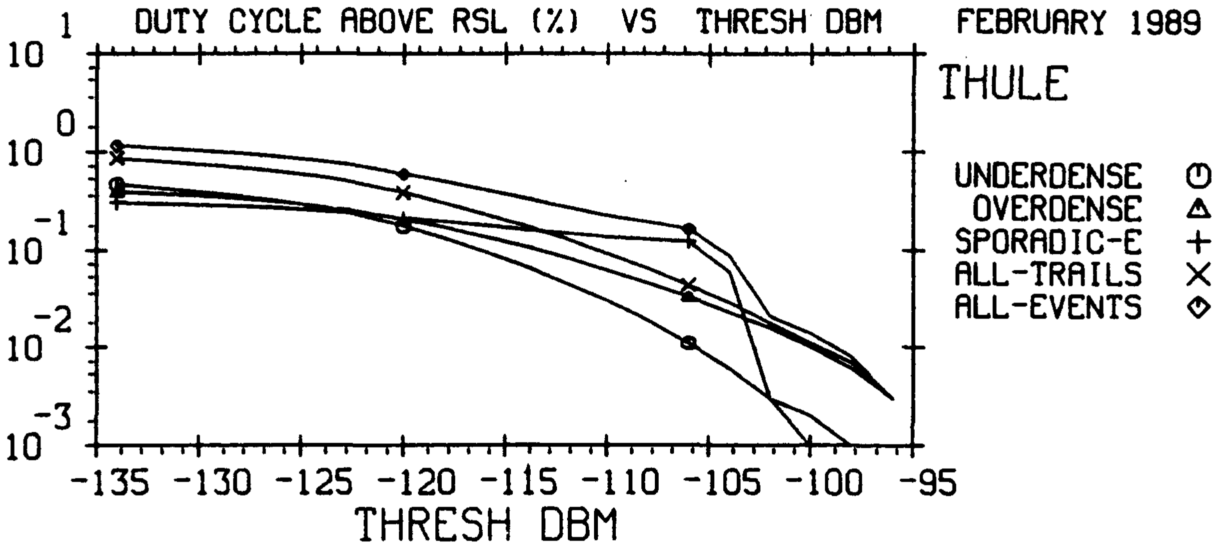
MENU*103,06-2
20-SEP-90
PLOT* 31.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

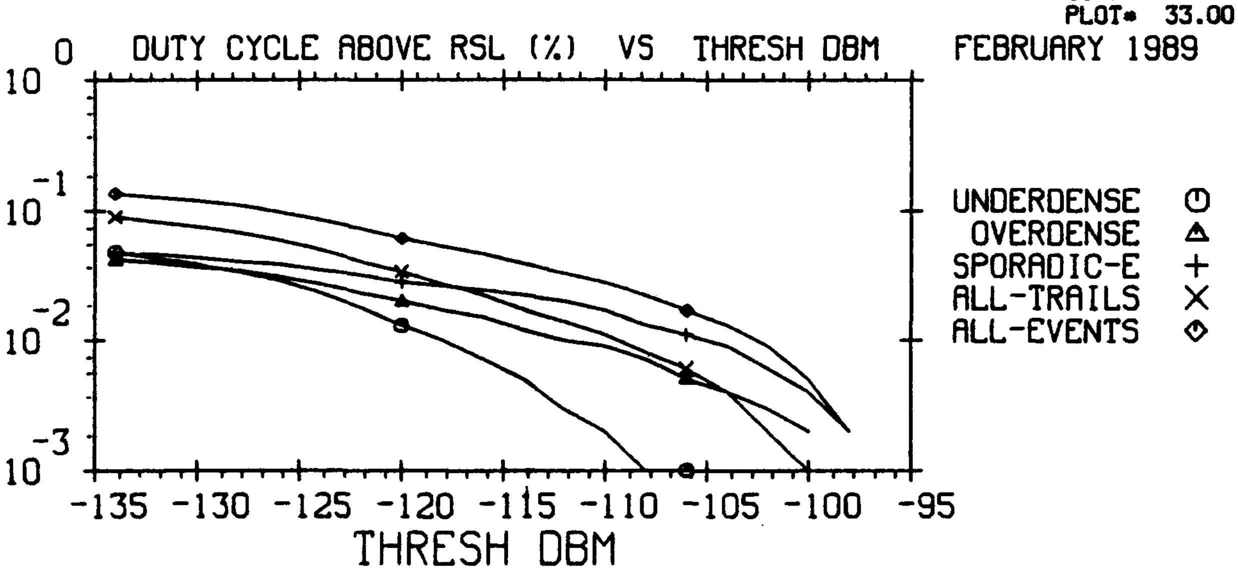
MENU*103,06-2
20-SEP-90
PLOT* 32.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

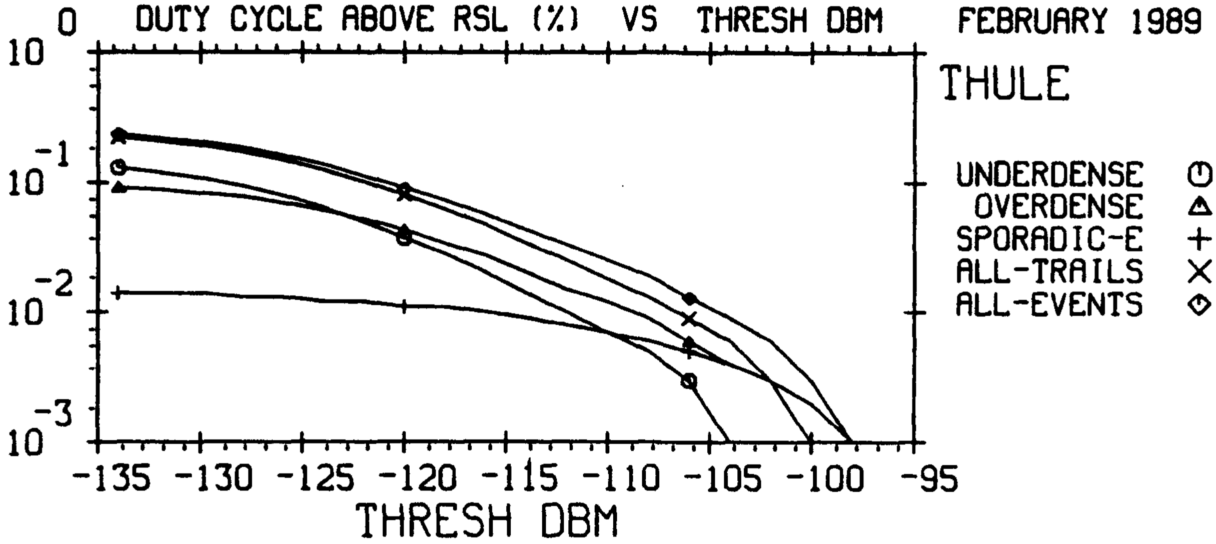
MENU=103,06-2
20-SEP-90
PLOT= 33.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

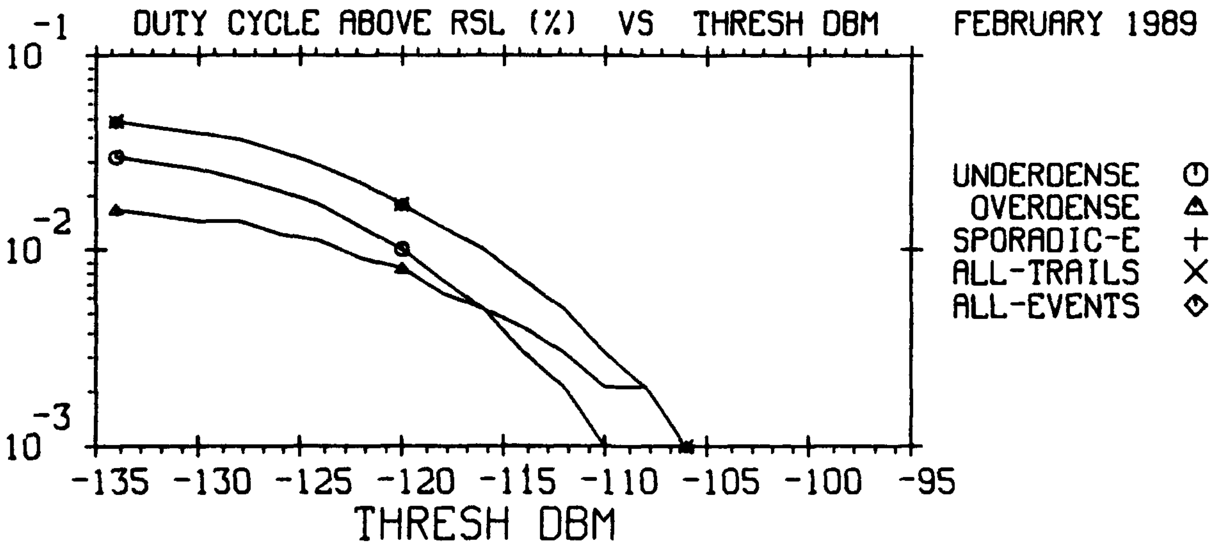
MENU=103,06-2
20-SEP-90
PLOT= 34.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

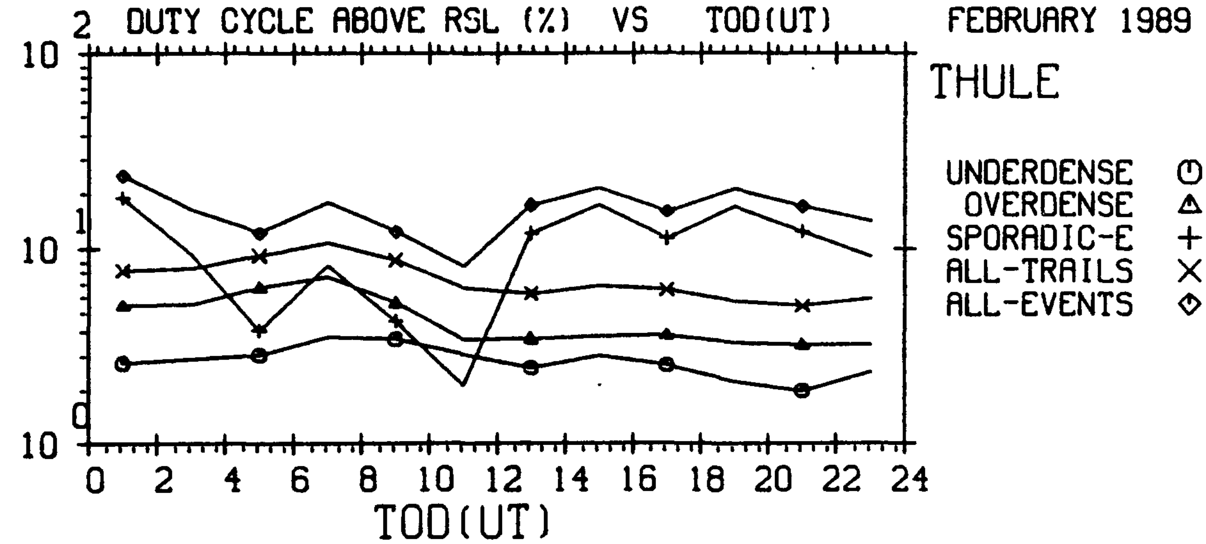
MENU=103,06-2
20-SEP-90
PLOT= 35.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

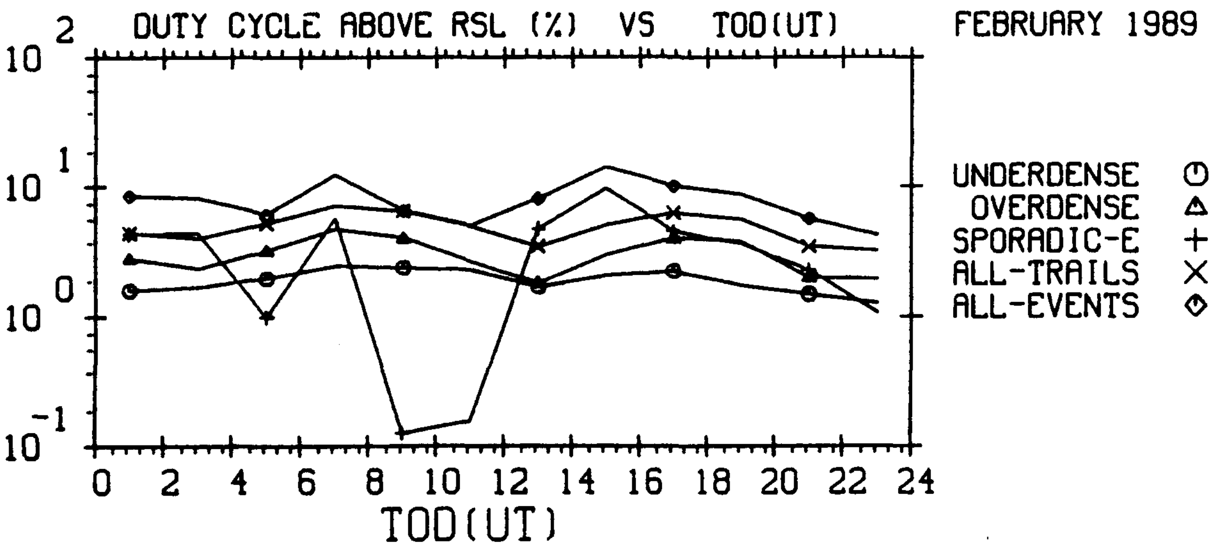
MENU=103,06-2
20-SEP-90
PLOT= 36.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

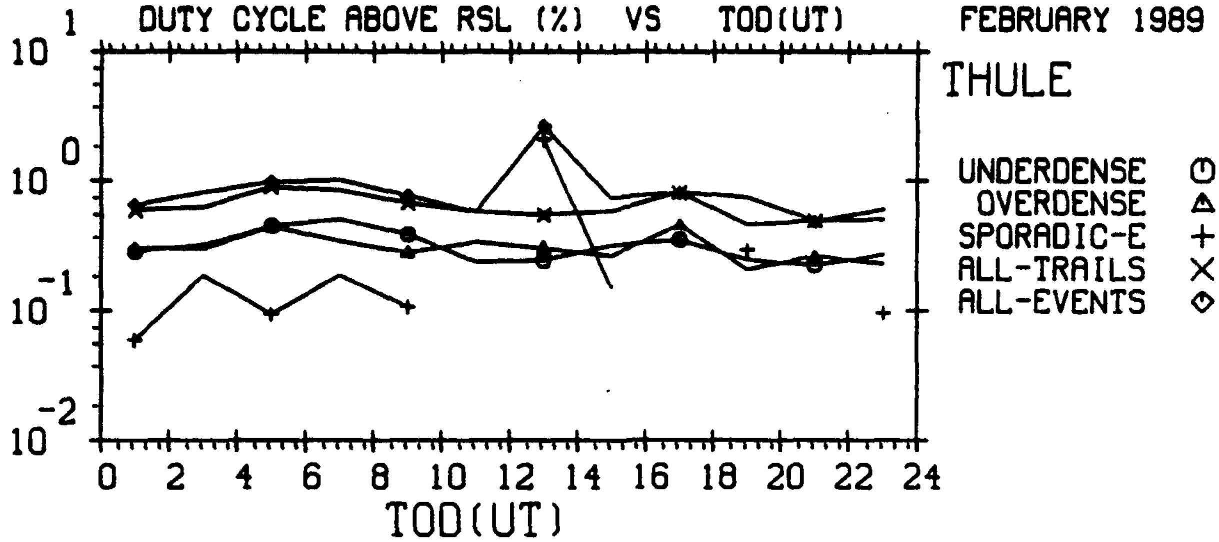
MENU=103,07-2
20-SEP-90
PLOT= 37.00




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

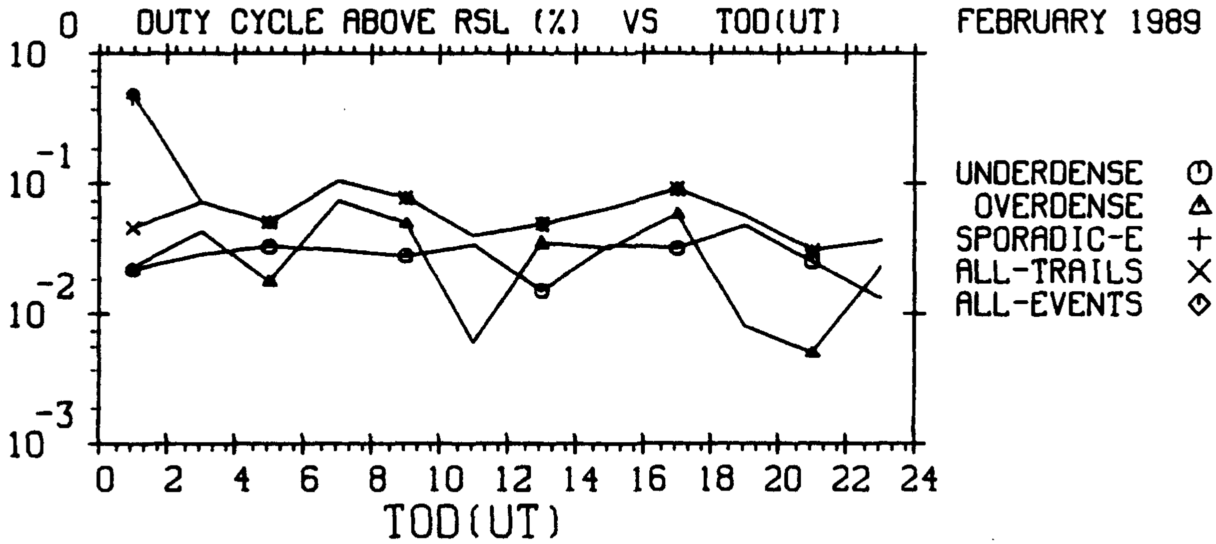
MENU=103,07-2
20-SEP-90
PLOT= 38.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

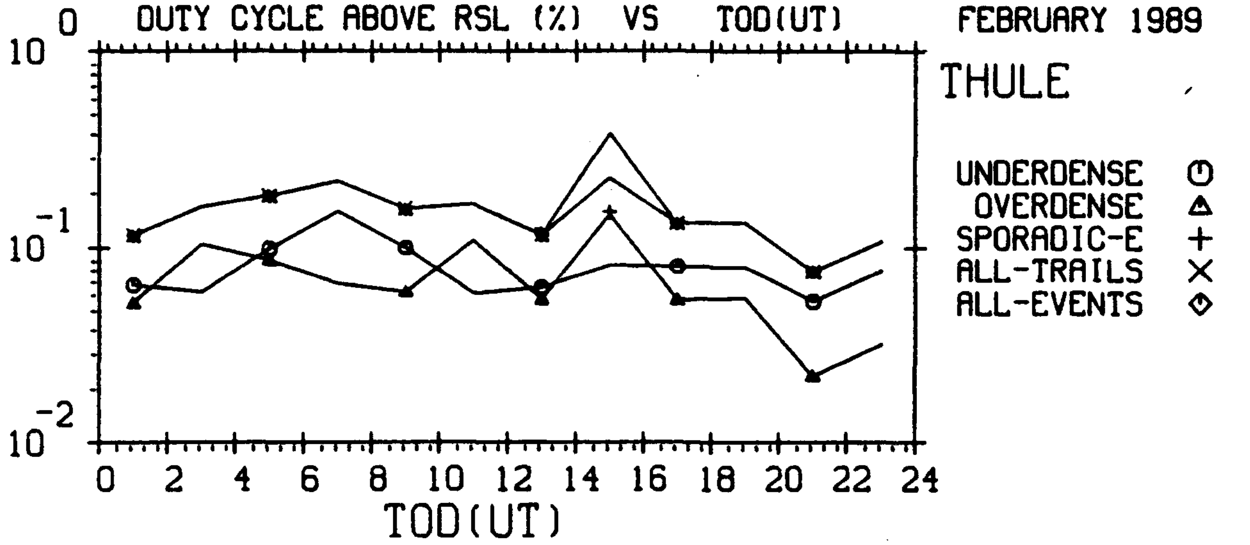
MENU=103,07-2
20-SEP-90
PLOT= 39.00




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

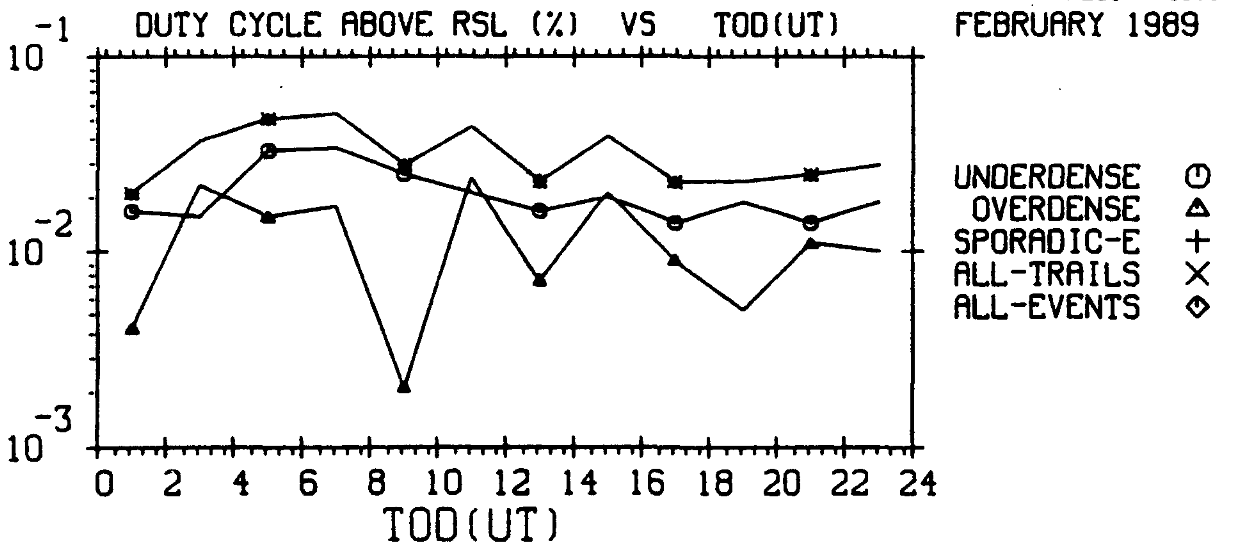
MENU=103,07-2
20-SEP-90
PLOT= 40.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

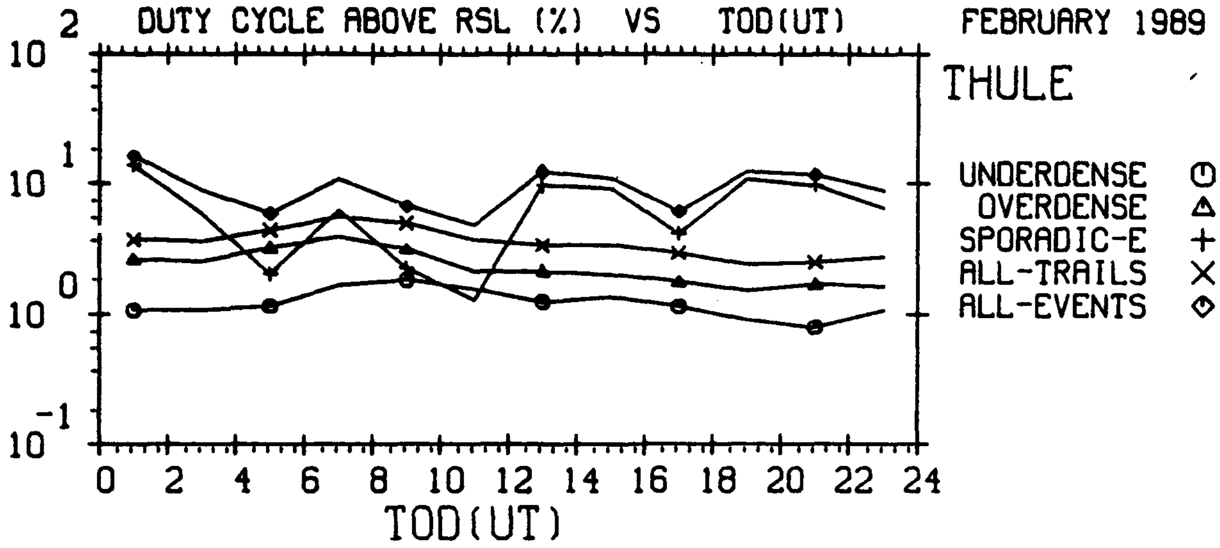
MENU=103,07-2
20-SEP-90
PLOT= 41.00




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

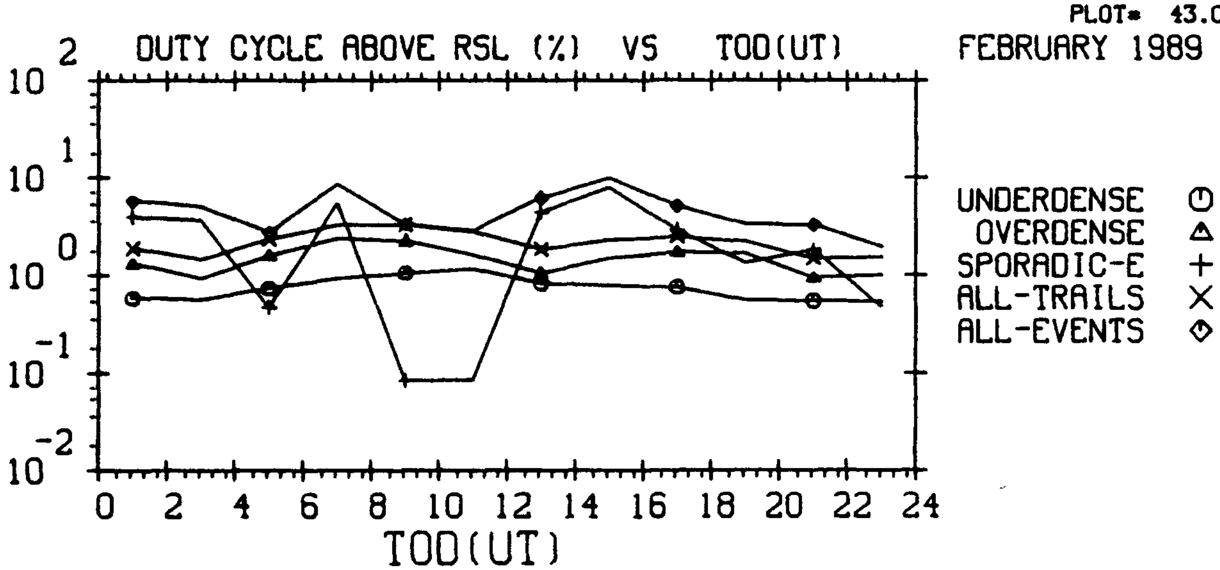
MENU=103,07-2
20-SEP-90
PLOT= 42.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

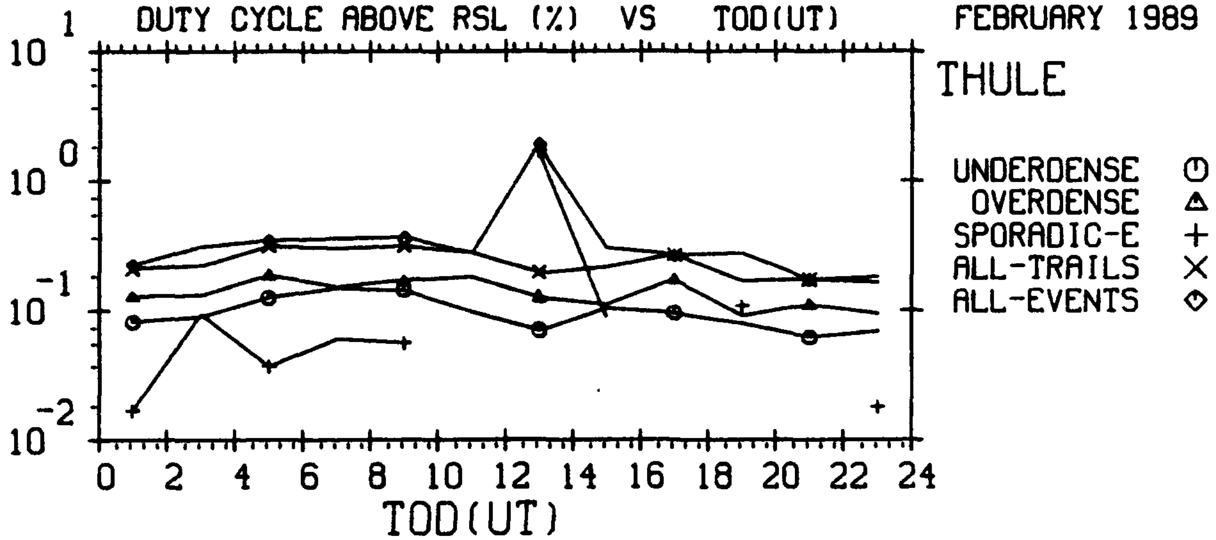
MENU=103,07-2
20-SEP-90
PLOT= 43.00




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

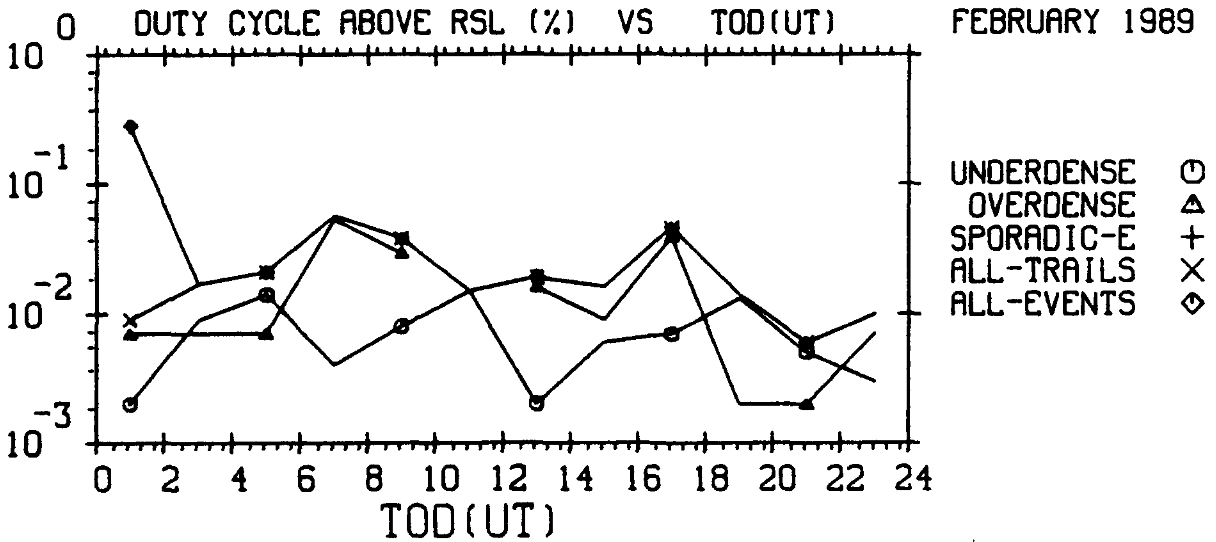
MENU=103,07-2
20-SEP-90
PLOT= 44.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

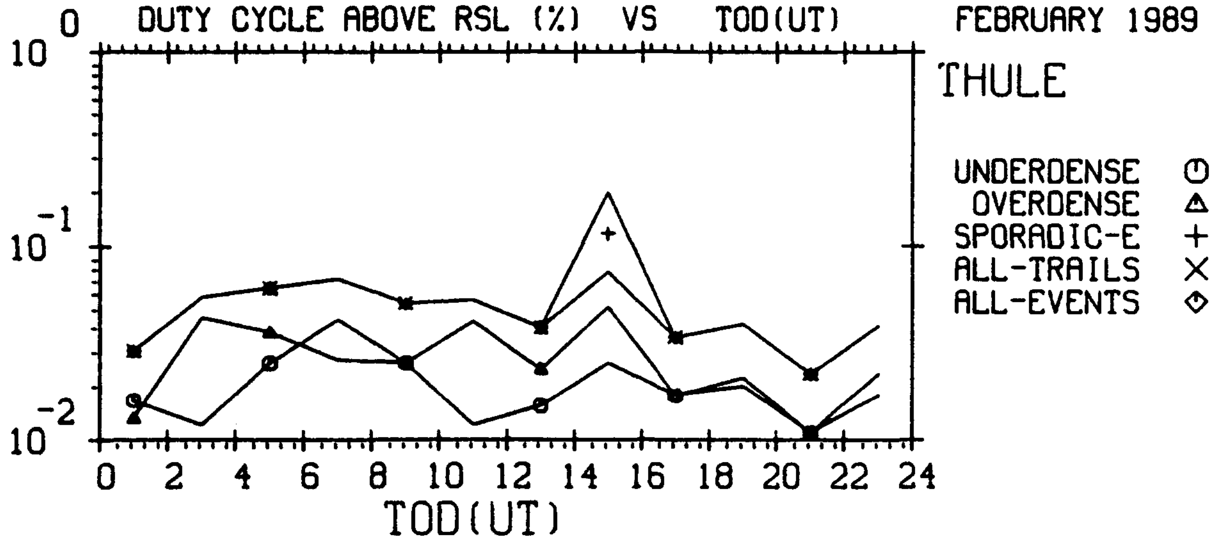
MENU=103,07-2
20-SEP-90
PLOT= 45.00




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

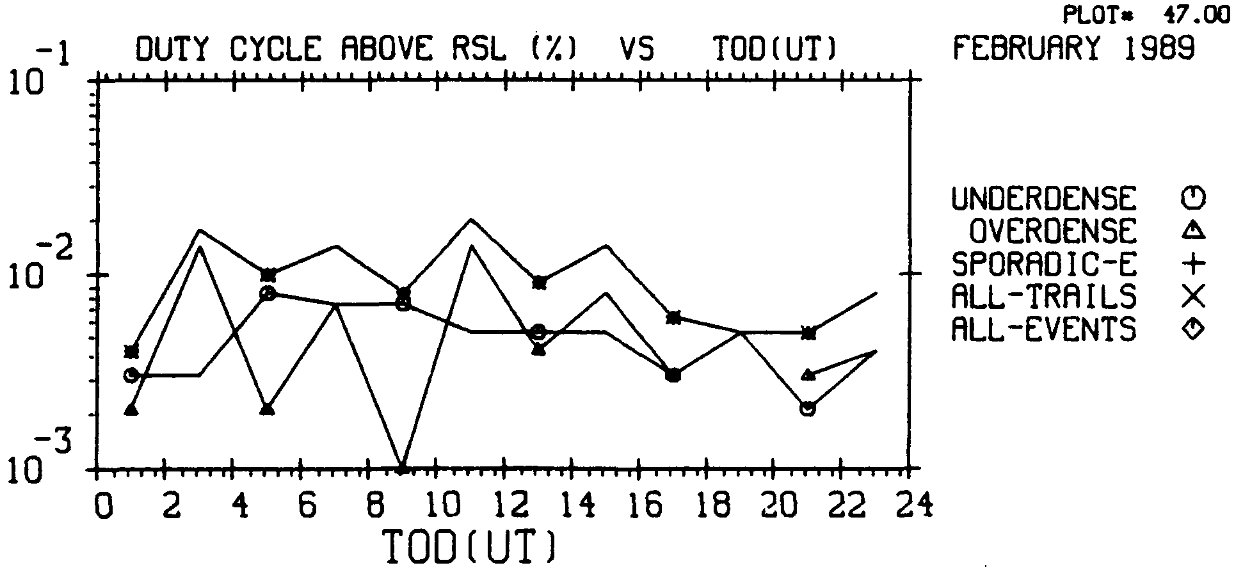
MENU=103,07-2
20-SEP-90
PLOT= 46.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

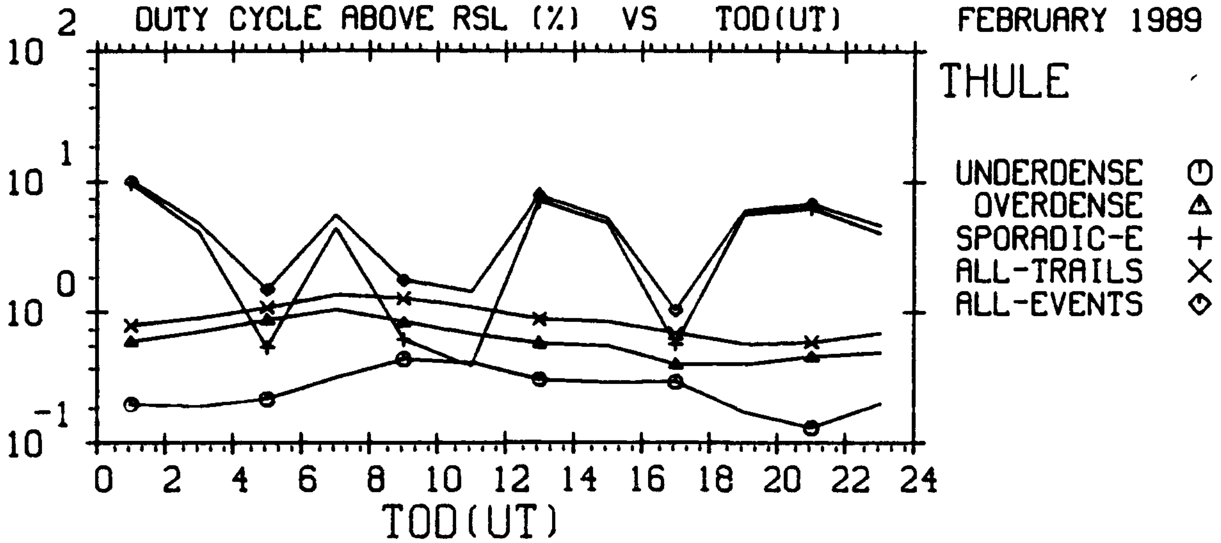
MENU*103,07-2
20-SEP-90
PLOT* 47.00




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

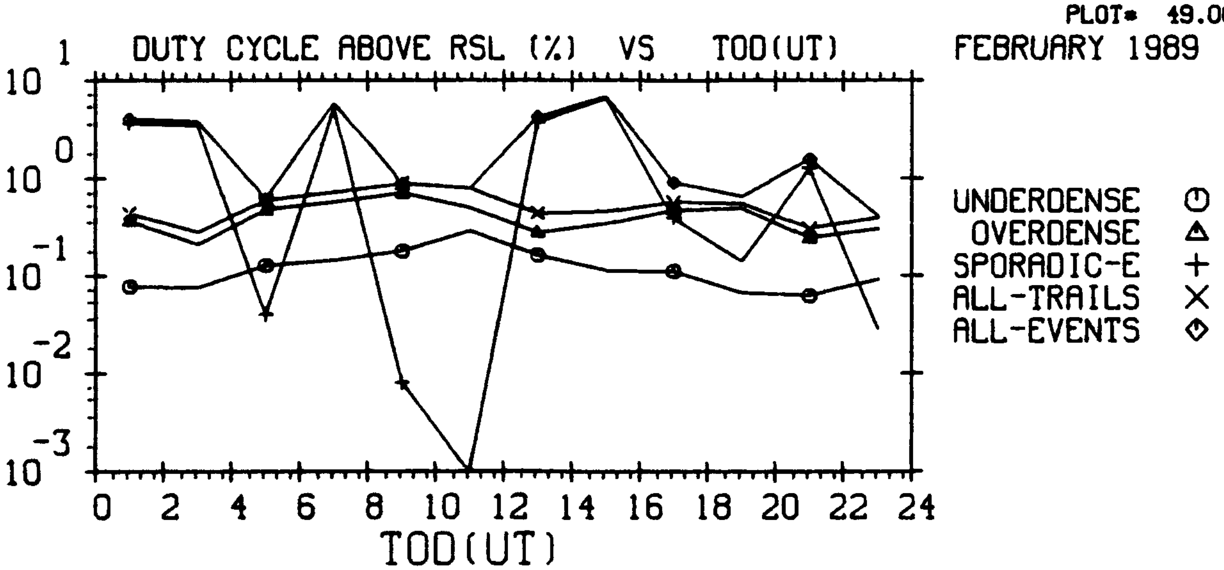
MENU*103,07-2
20-SEP-90
PLOT* 48.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

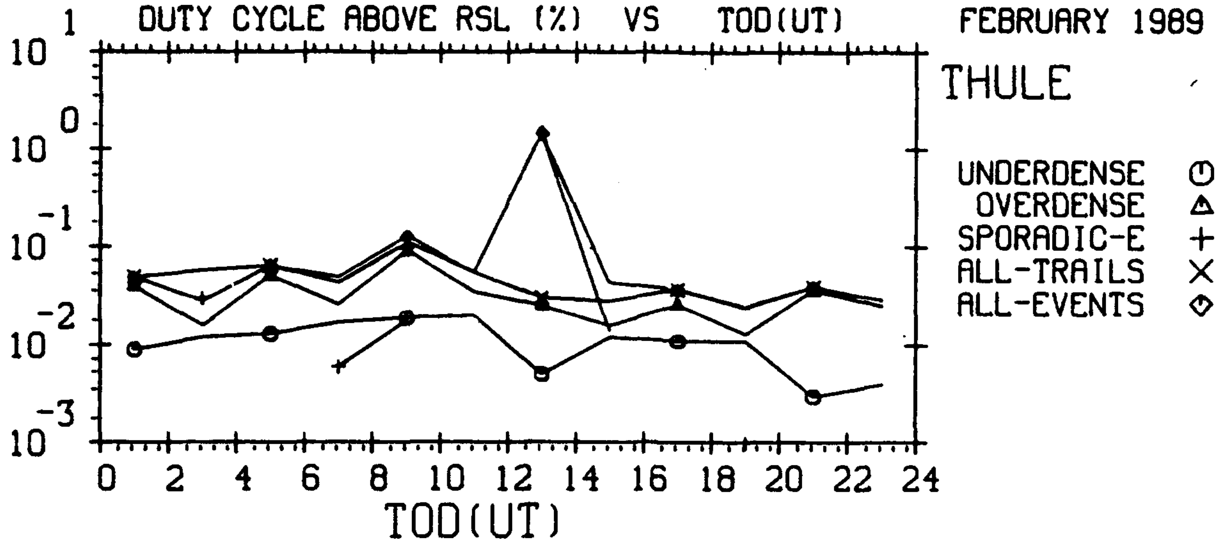
MENU=103,07-2
20-SEP-90
PLOT= 49.00




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

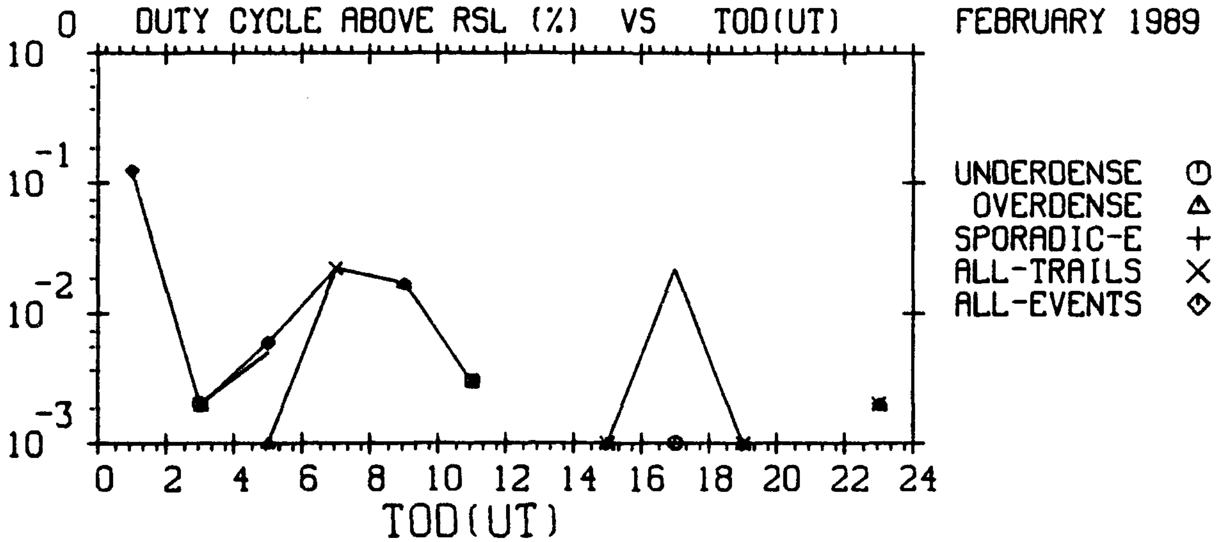
MENU=103,07-2
20-SEP-90
PLOT= 50.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

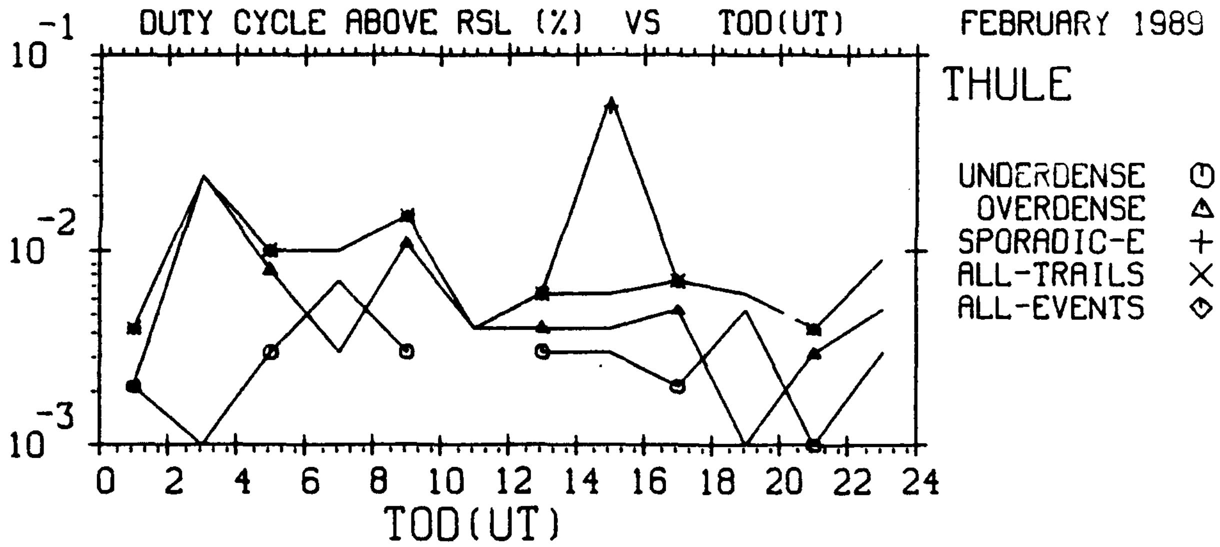
MENU*103,07-2
20-SEP-90
PLOT* 51.00




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

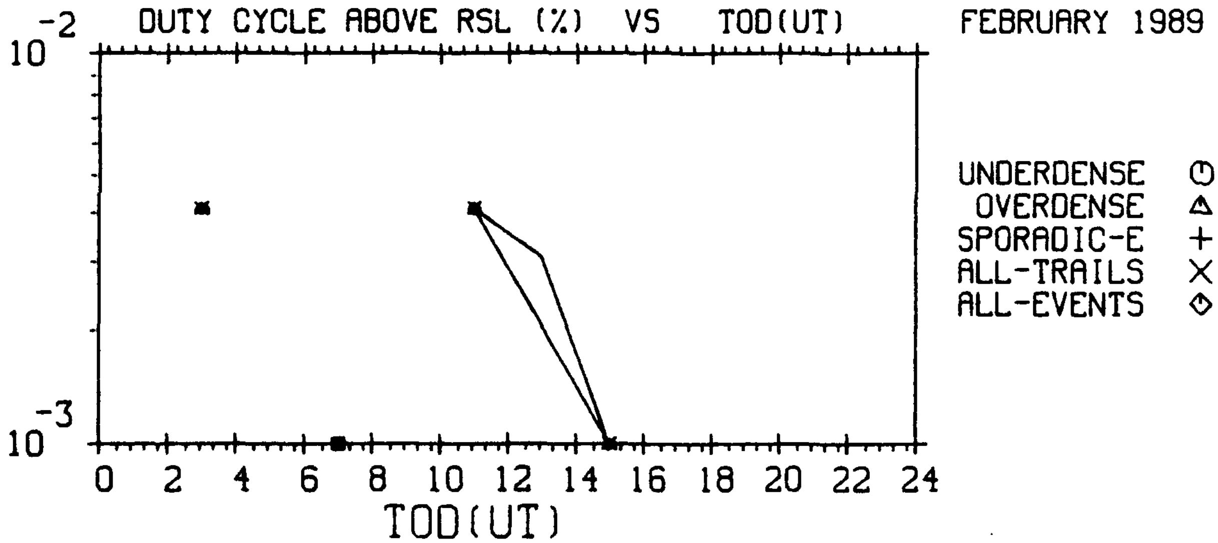
MENU*103,07-2
20-SEP-90
PLOT* 52.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

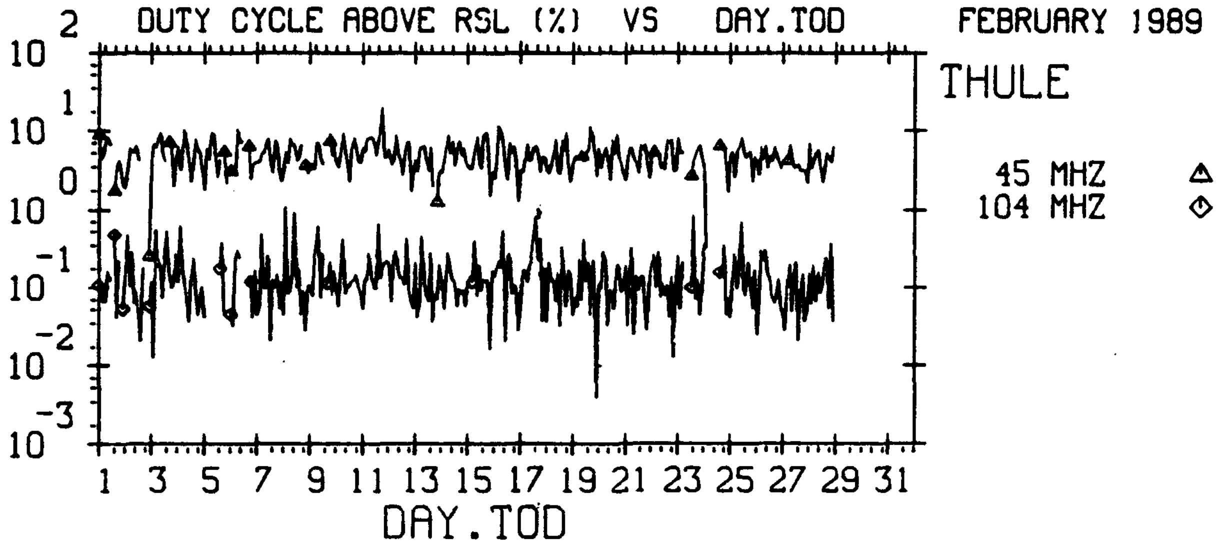
MENU#103,07-2
20-SEP-90
PLOT# 53.00




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

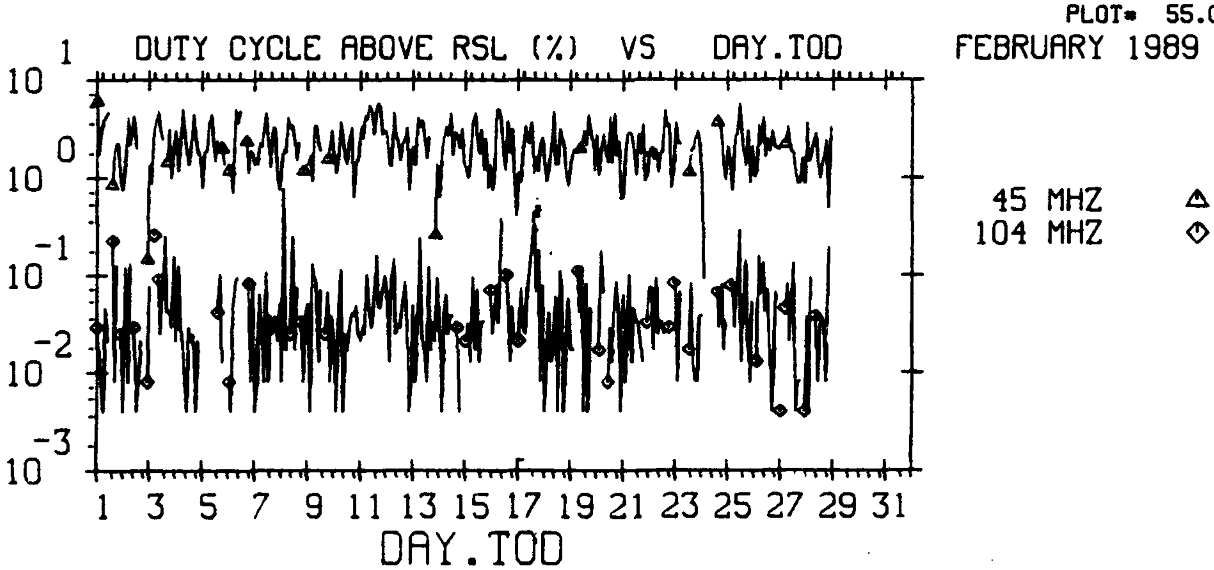
MENU#103,07-2
20-SEP-90
PLOT# 54.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
POLARIZATION - HORIZONTAL

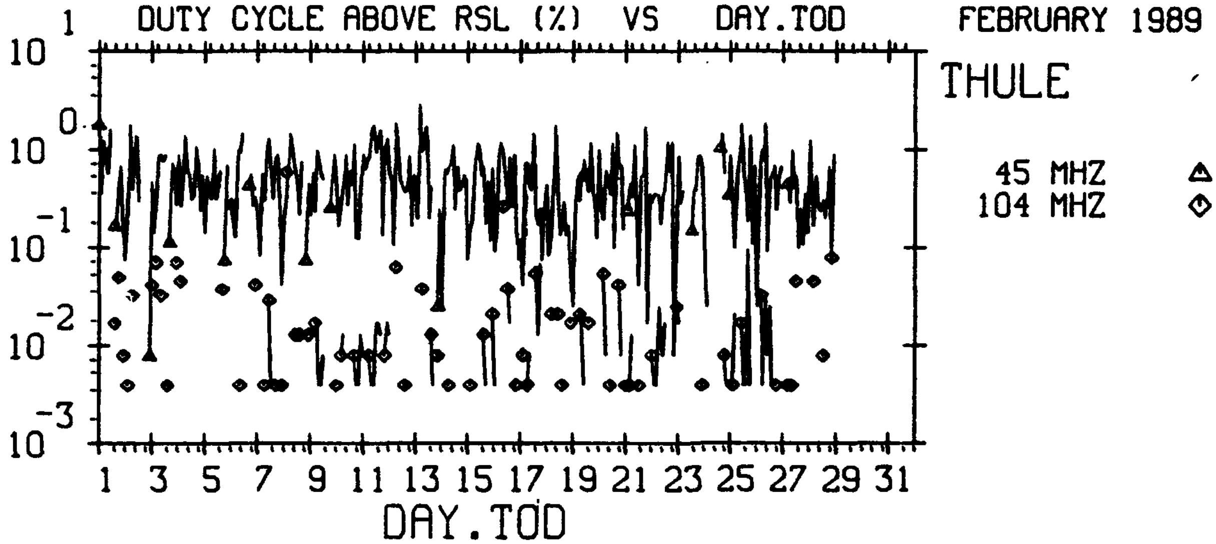
MENU=103,09-2
20-SEP-90
PLOT= 55.00




THRESHOLD - -116.0 DBM RSL
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
POLARIZATION - HORIZONTAL

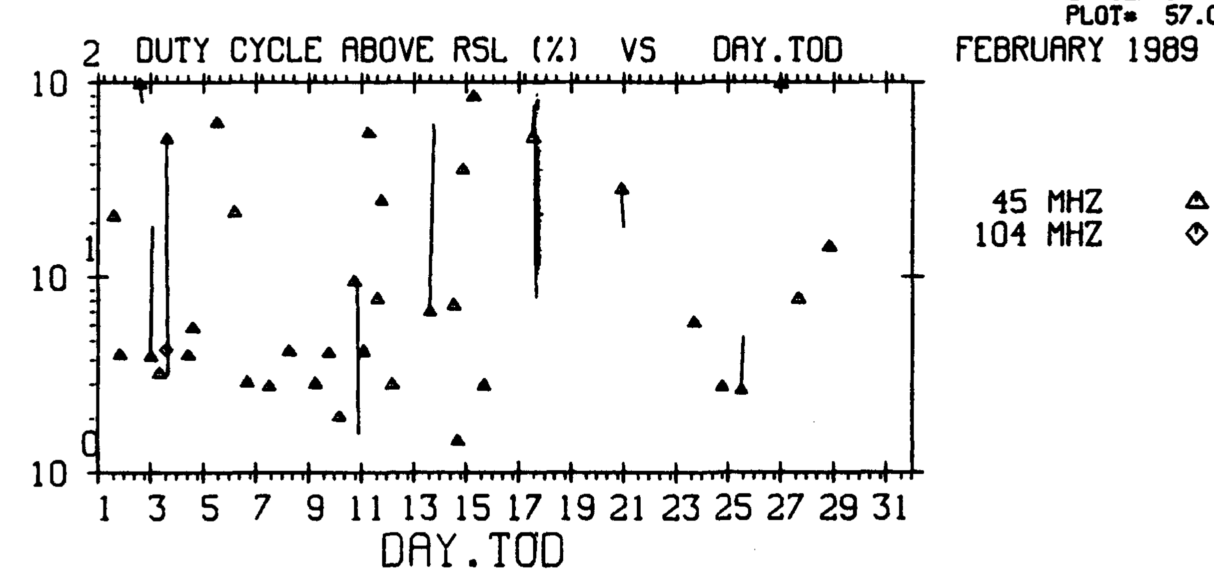
MENU=103,09-2
20-SEP-90
PLOT= 56.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM



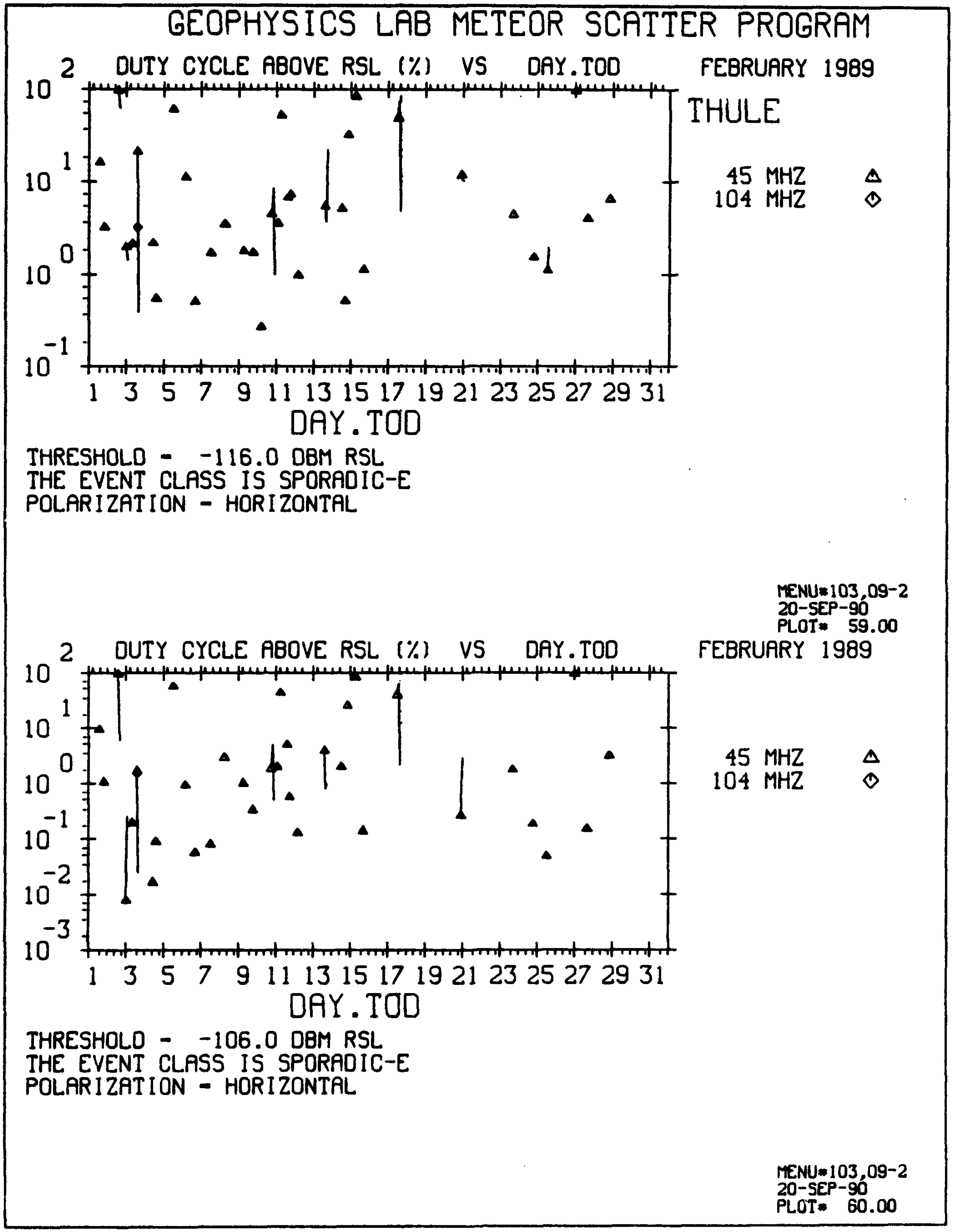

THRESHOLD - -106.0 DBM RSL
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
POLARIZATION - HORIZONTAL

MENU=103,09-2
20-SEP-90
PLOT= 57.00

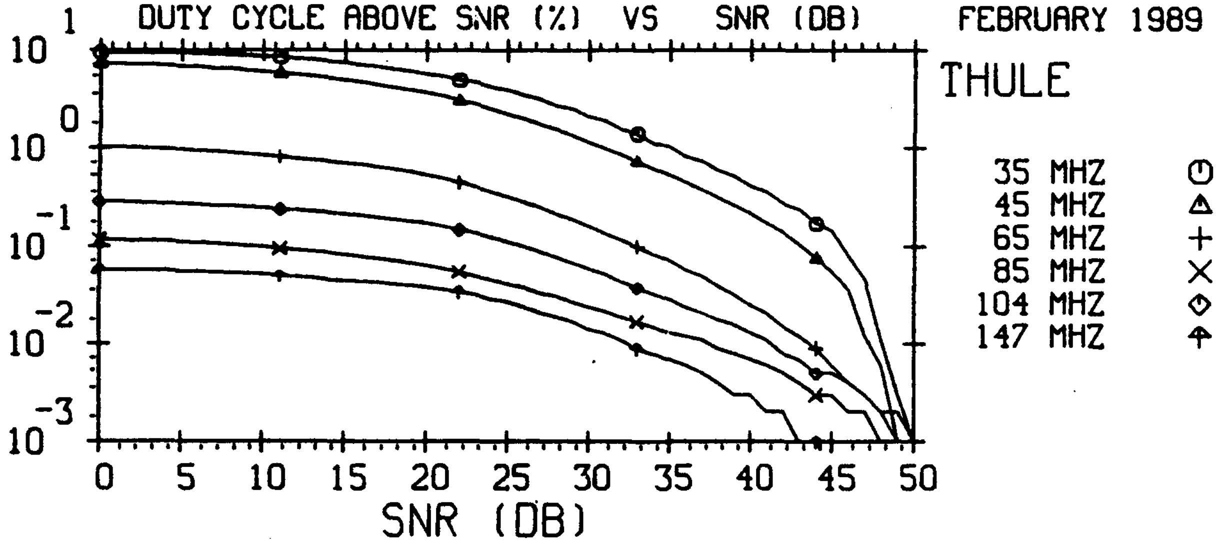



THRESHOLD - -126.0 DBM RSL
THE EVENT CLASS IS SPORADIC-E
POLARIZATION - HORIZONTAL

MENU=103,09-2
20-SEP-90
PLOT= 58.00

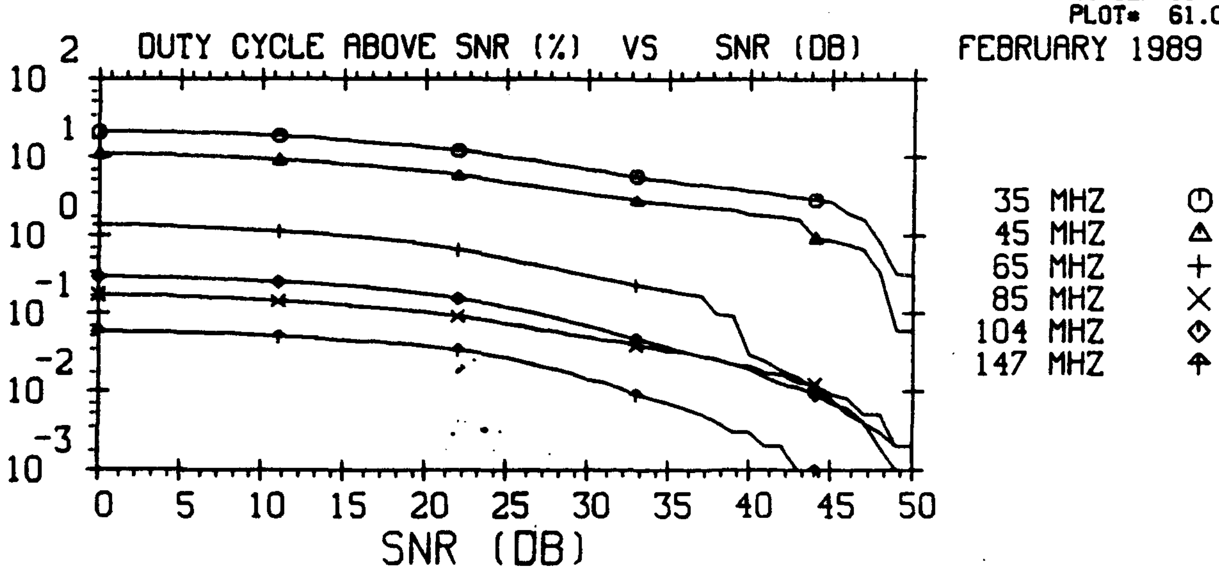

GEOPHYSICS LAB METEOR SCATTER PROGRAM
DUTY CYCLE ABOVE RSL (%) VS DAY.TOD
FEBRUARY 1989
THULE
45 MHZ
104 MHZ
DAY.TOD
THRESHOLD - -116.0 DBM RSL
THE EVENT CLASS IS SPORADIC-E
POLARIZATION - HORIZONTAL
MENU*103,09-2
20-SEP-90
PLOT* 59.00
DUTY CYCLE ABOVE RSL (%) VS DAY.TOD
FEBRUARY 1989
45 MHZ
104 MHZ
DAY.TOD
THRESHOLD - -106.0 DBM RSL
THE EVENT CLASS IS SPORADIC-E
POLARIZATION - HORIZONTAL
MENU*103,09-2
20-SEP-90
PLOT* 60.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

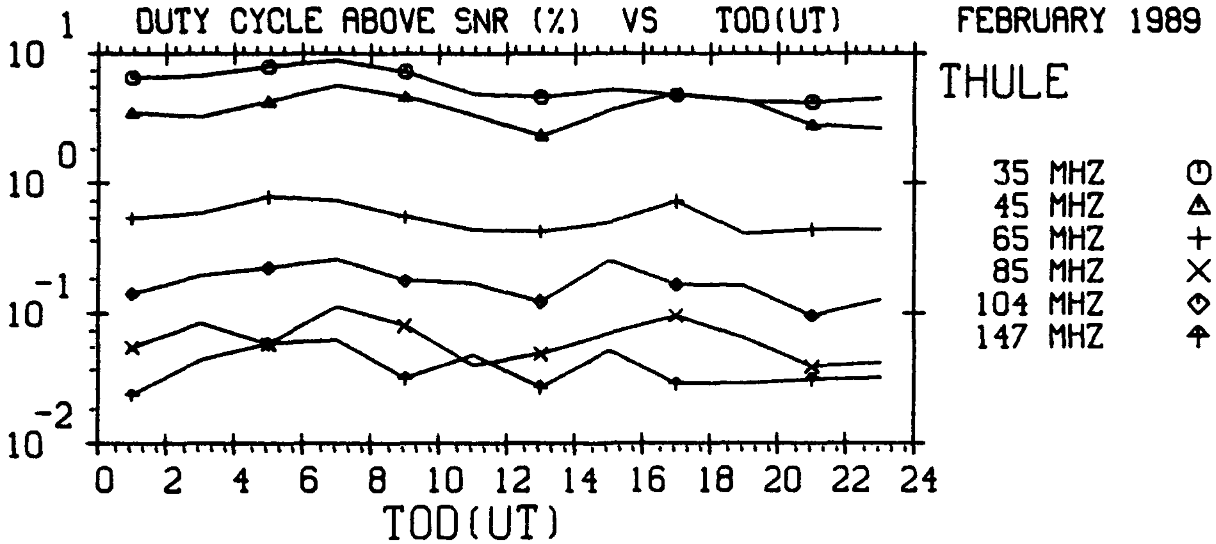
MENU=104,02-2
20-SEP-90
PLOT= 61.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

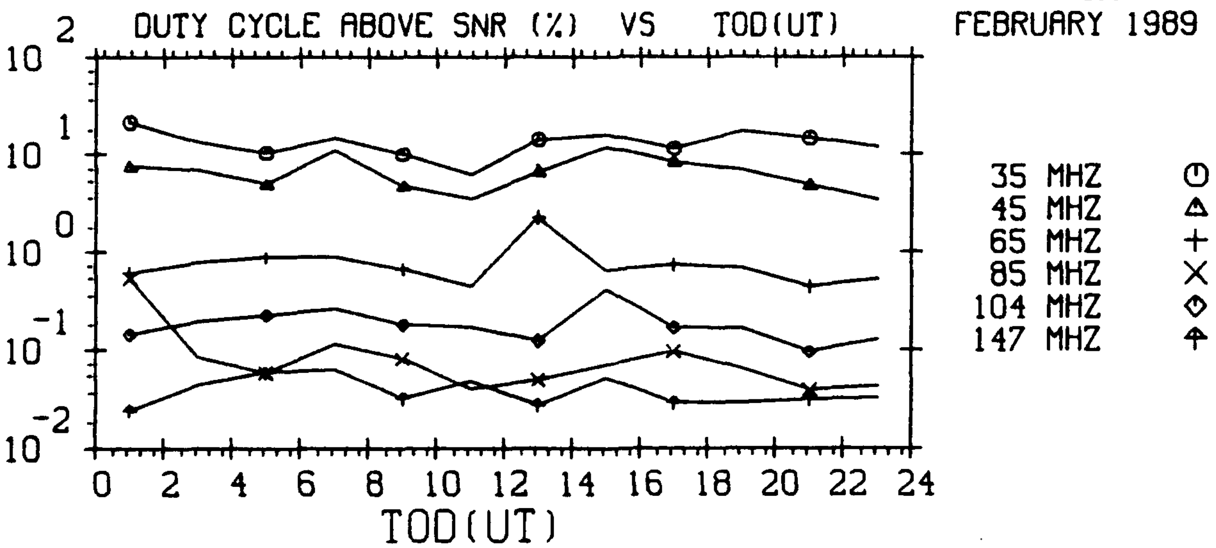
MENU=104,02-2
20-SEP-90
PLOT= 62.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

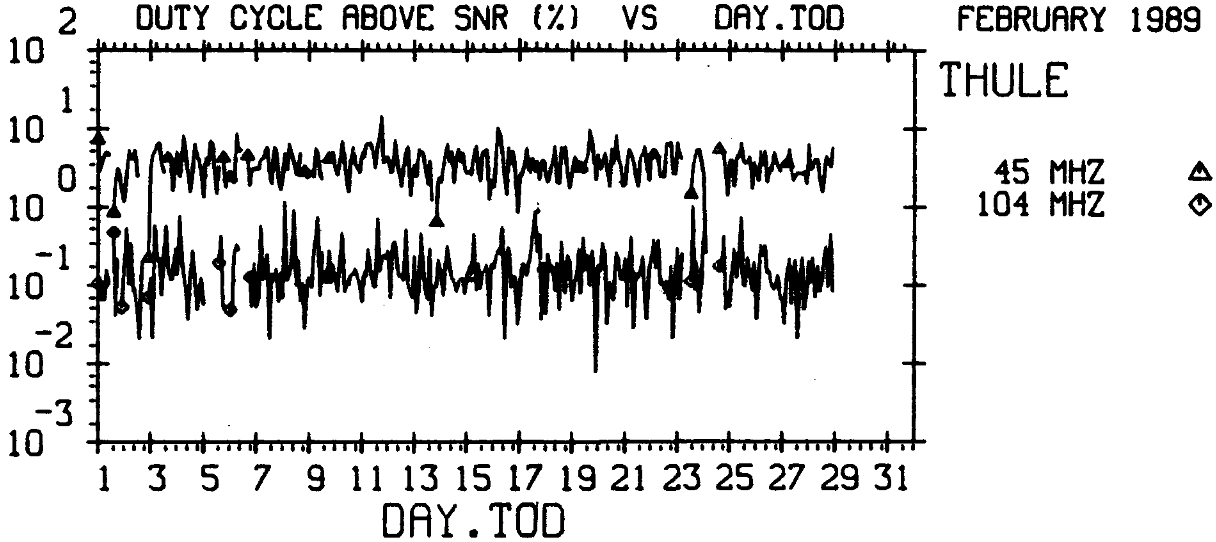
MENU=104,03-2
20-SEP-90
PLOT= 63.00




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

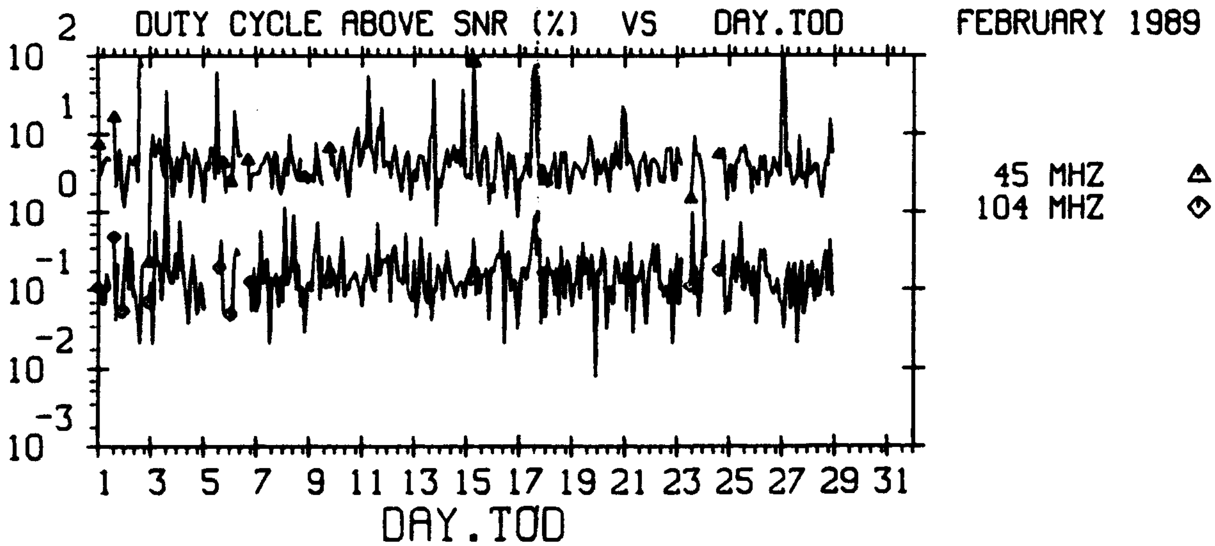
MENU=104,03-2
20-SEP-90
PLOT= 64.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

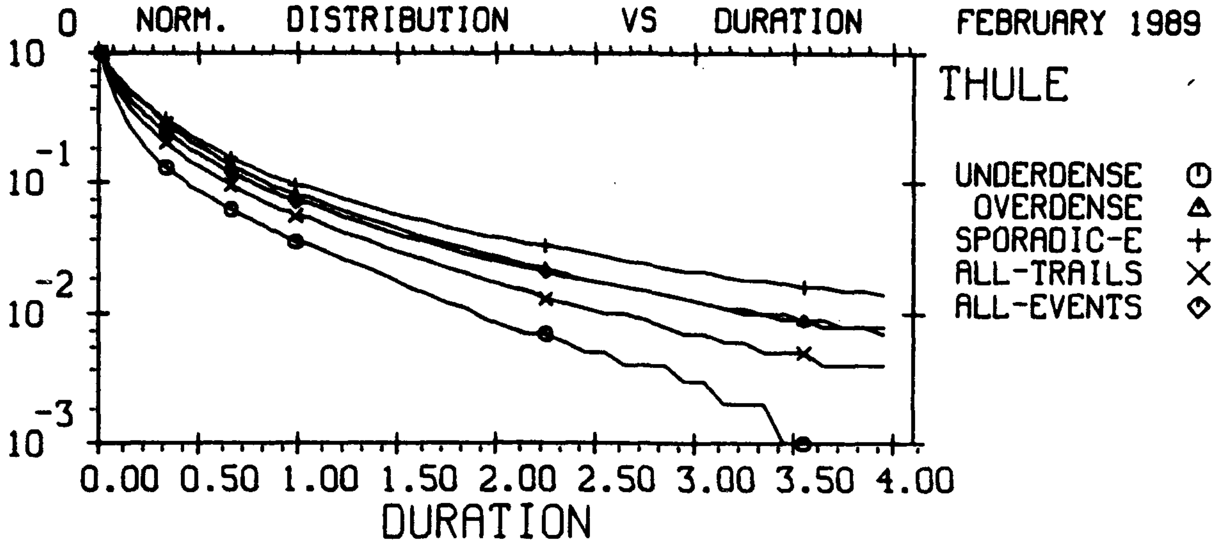
MENU=104,09-2
20-SEP-90
PLOT= 65.00




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

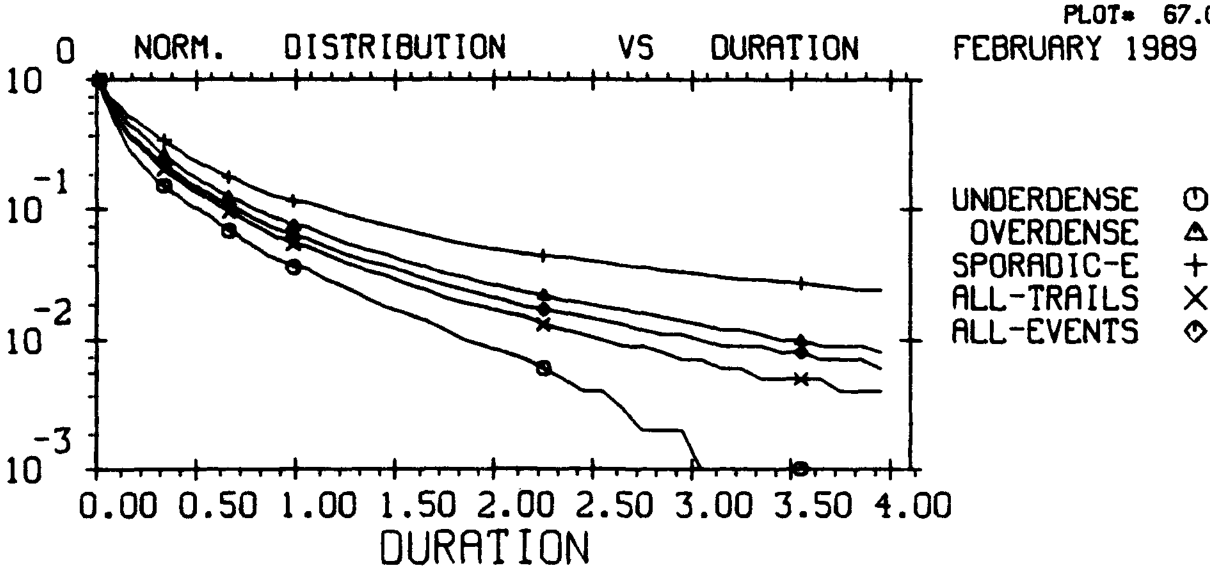
MENU=104,09-2
20-SEP-90
PLOT= 66.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER - 32646. OVER - 26751. SPOR-E - 39141.
TRAILS - 59397. EVENTS - 98538.

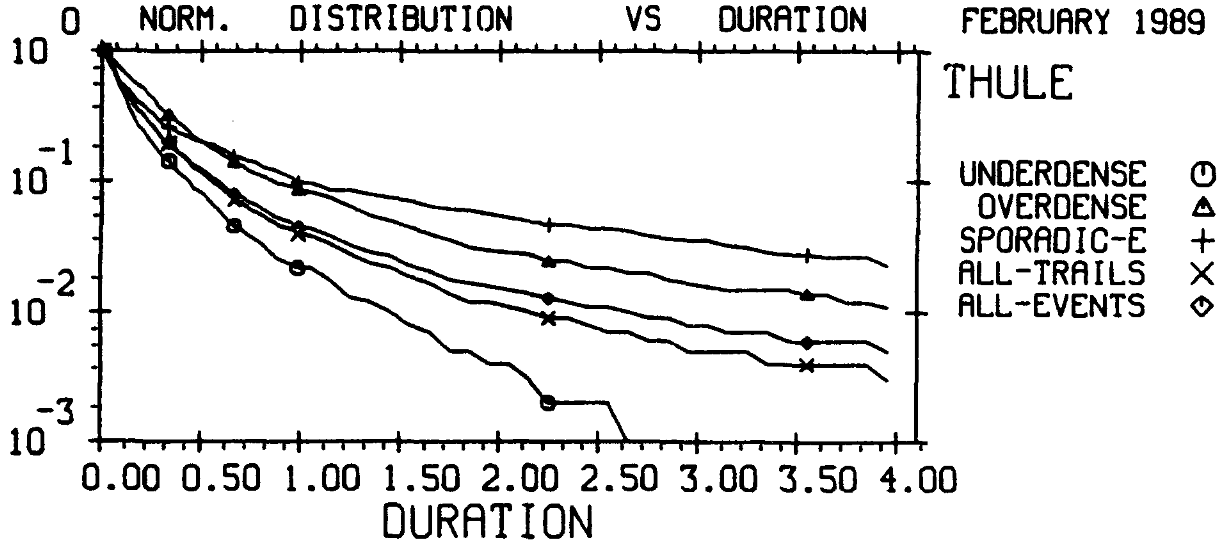
MENU=106,02-4
20-SEP-90
PLOT= 67.00




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER - 19300. OVER - 16968. SPOR-E - 5548.
TRAILS - 36268. EVENTS - 41816.

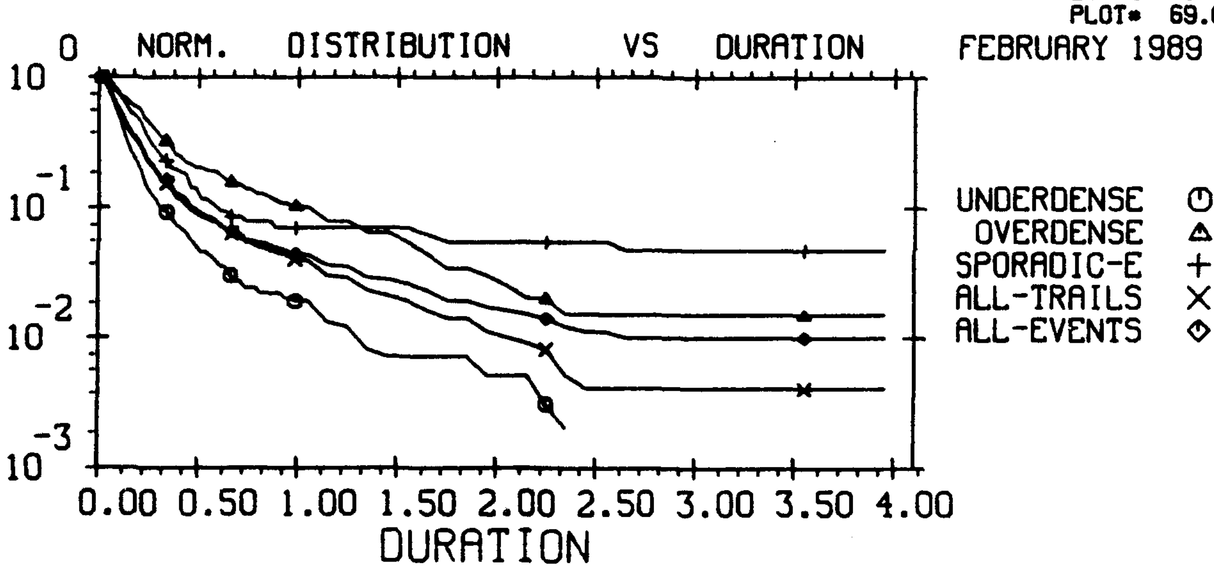
MENU=106,02-4
20-SEP-90
PLOT= 68.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER - 5647. OVER - 2275. SPOR-E - 787.
TRAILS - 7922. EVENTS - 8709.

MENU=106,02-4
20-SEP-90
PLOT= 69.00

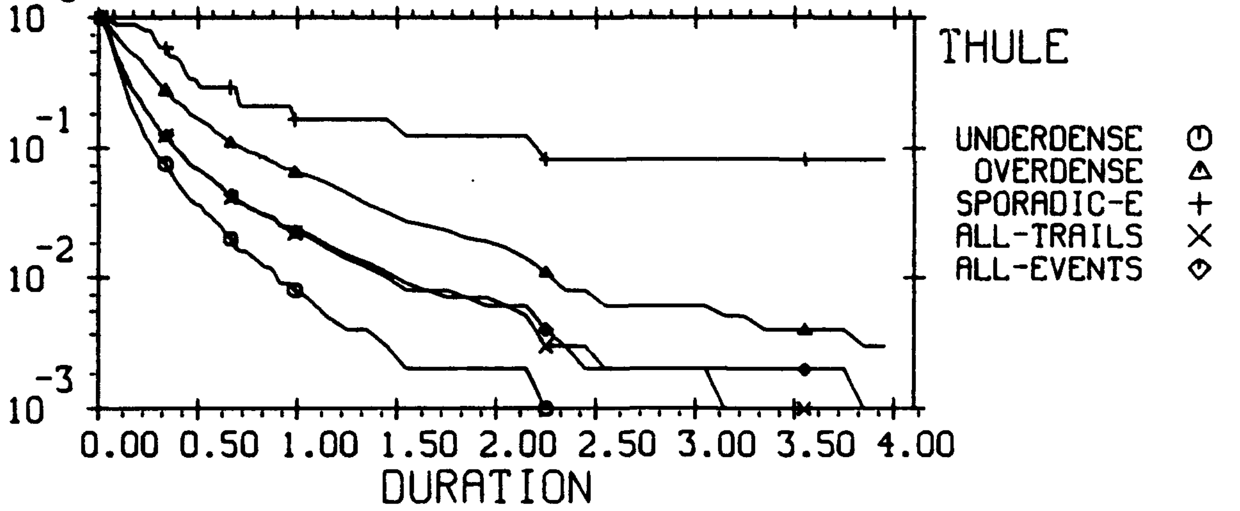



EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER - 594. OVER - 203. SPOR-E - 129.
TRAILS - 797. EVENTS - 926.

MENU=106,02-4
20-SEP-90
PLOT= 70.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM

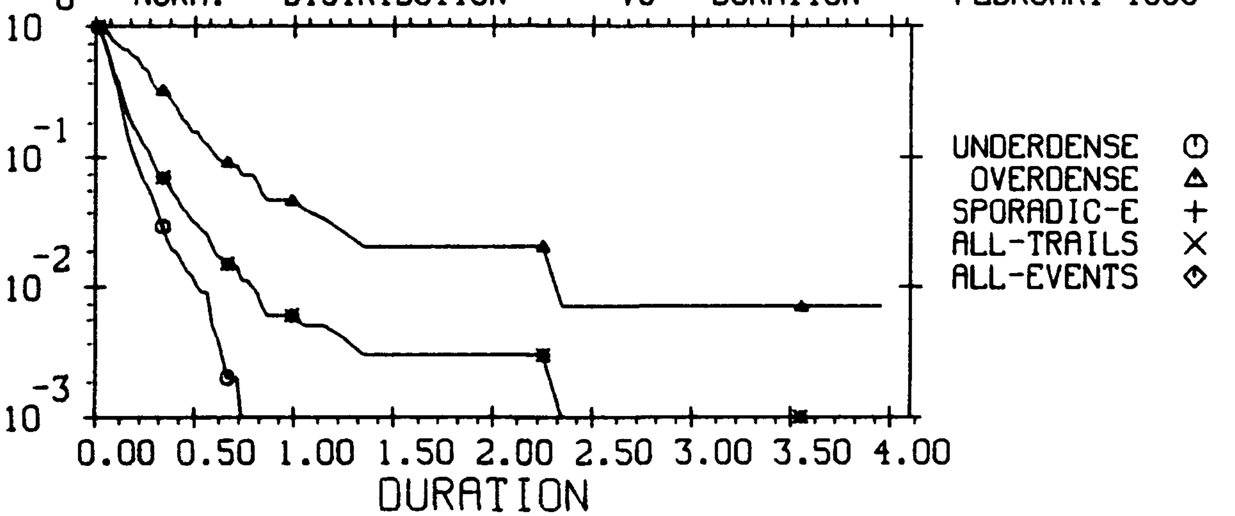
NORM. DISTRIBUTION VS DURATION FEBRUARY 1989




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER - 2843. OVER - 929. SPOR-E - 24.
TRAILS - 3772. EVENTS - 3796.

MENU=106,02-4
20-SEP-90
PLOT= 71.00

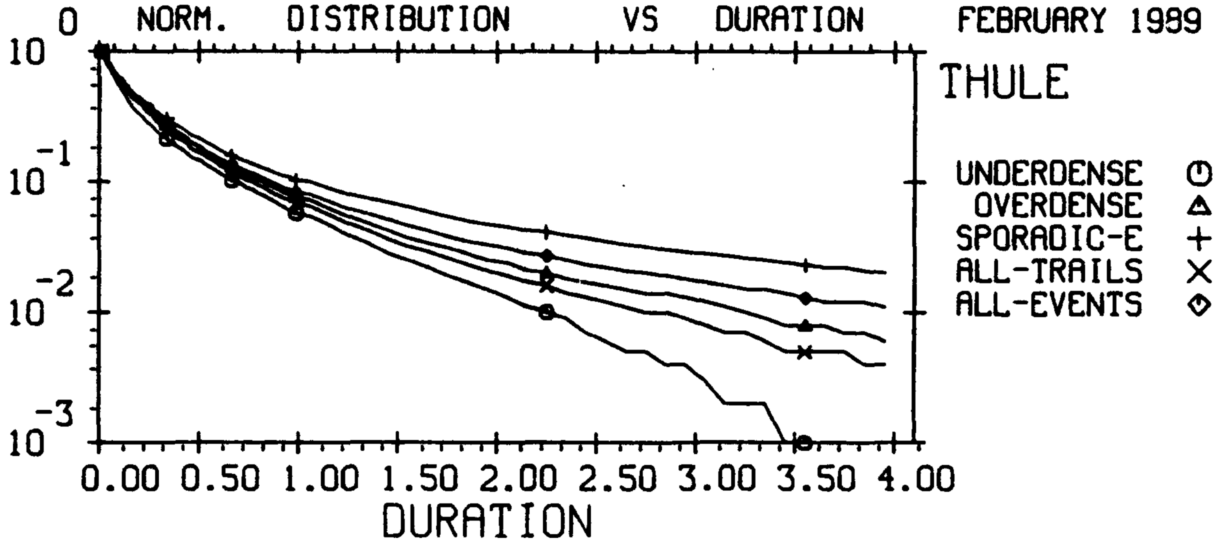
NORM. DISTRIBUTION VS DURATION FEBRUARY 1989




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER - 940. OVER - 153. SPOR-E - 0.
TRAILS - 1093. EVENTS - 1093.

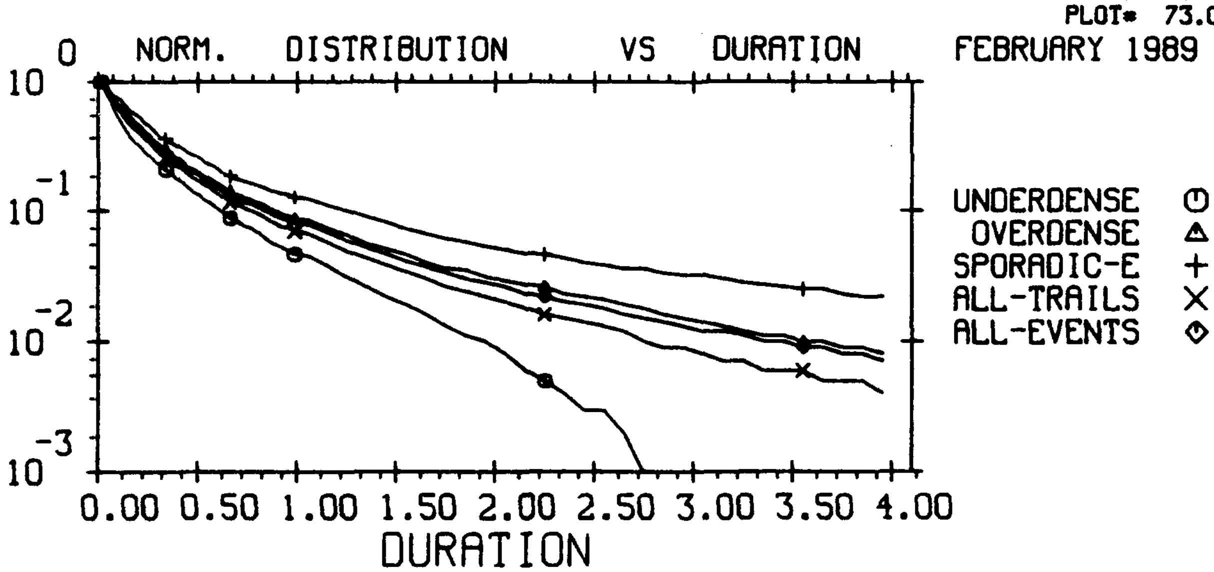
MENU=106,02-4
20-SEP-90
PLOT= 72.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER - 10212. OVER - 14282. SPOR-E - 19262.
TRAILS - 24494. EVENTS - 43756.

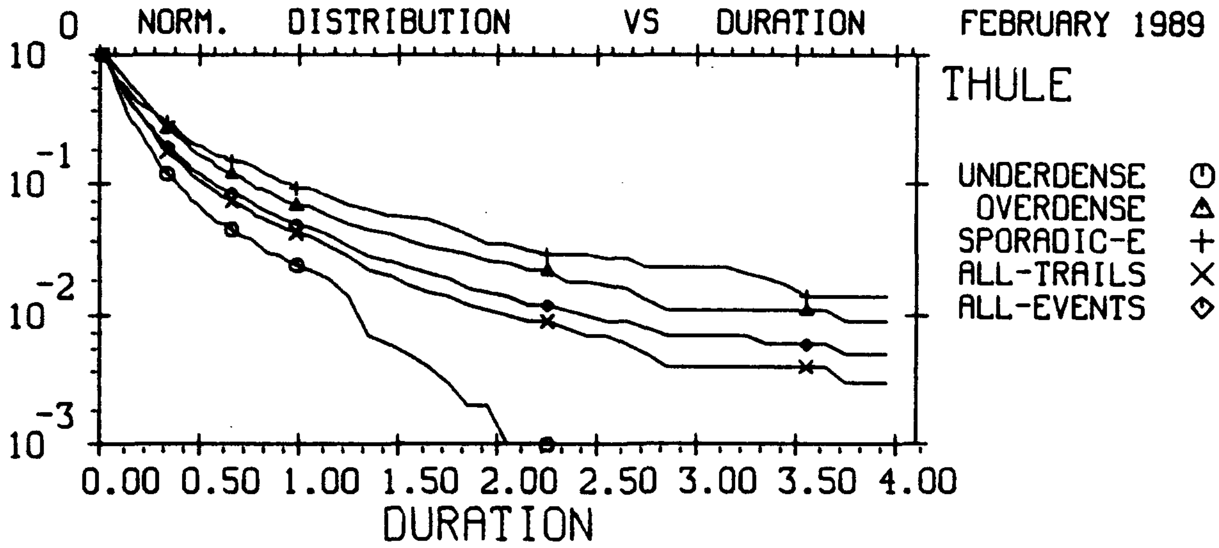
MENU=106,02-4
20-SEP-90
PLOT= 73.00




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER - 6131. OVER - 7465. SPOR-E - 3237.
TRAILS - 13596. EVENTS - 16833.

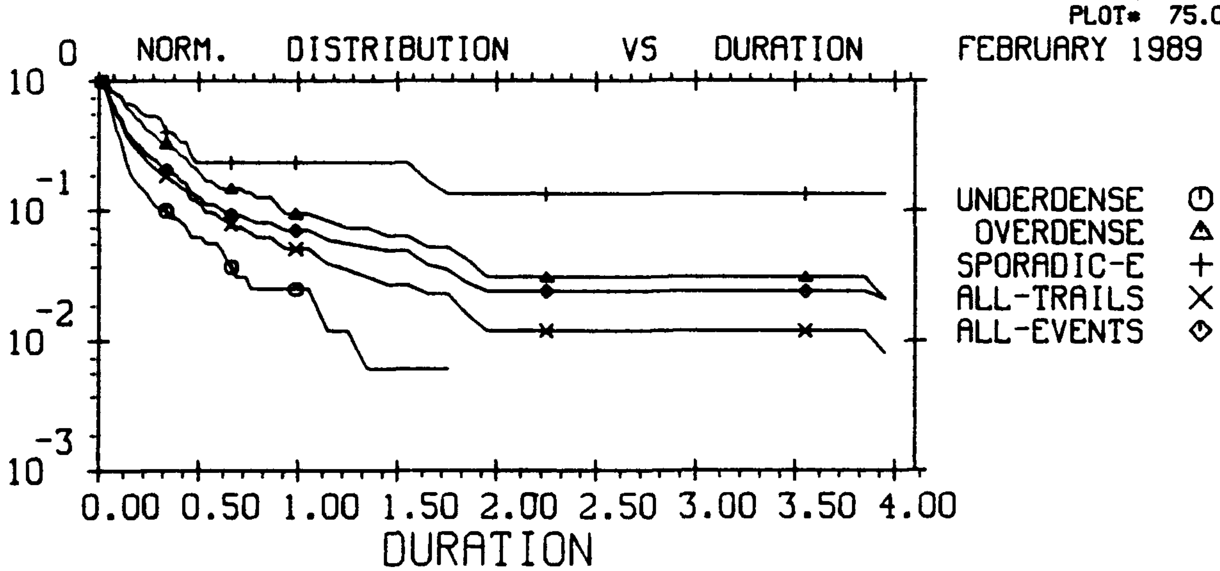
MENU=106,02-4
20-SEP-90
PLOT= 74.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER - 1775. OVER - 1136. SPOR-E - 484.
TRAILS - 2911. EVENTS - 3395.

MENU=106,02-4
20-SEP-90
PLOT= 75.00

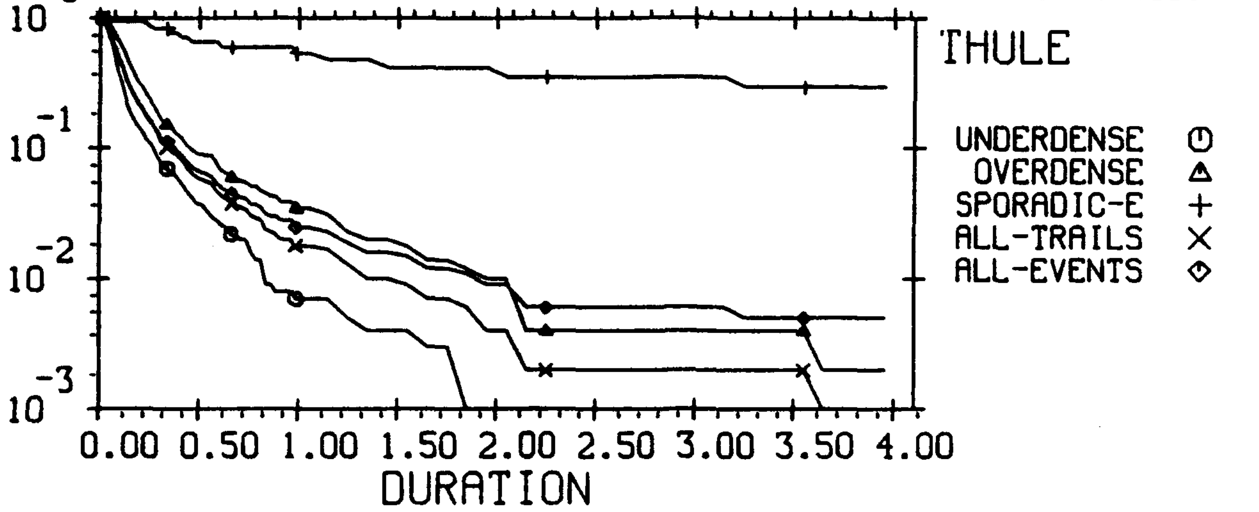



EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER - 161. OVER - 96. SPOR-E - 30.
TRAILS - 257. EVENTS - 287.

MENU=106,02-4
20-SEP-90
PLOT= 76.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

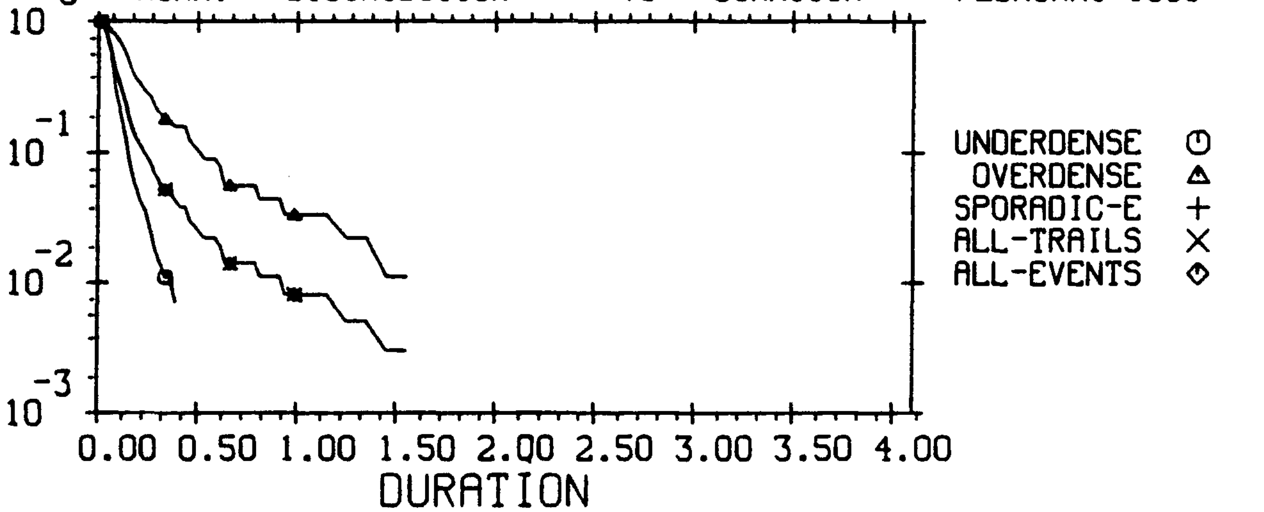
NORM. DISTRIBUTION VS DURATION FEBRUARY 1989




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER - 759. OVER - 511. SPOR-E - 17.
TRAILS - 1270. EVENTS - 1287.

MENU*106,02-4
20-SEP-90
PLOT* 77.00

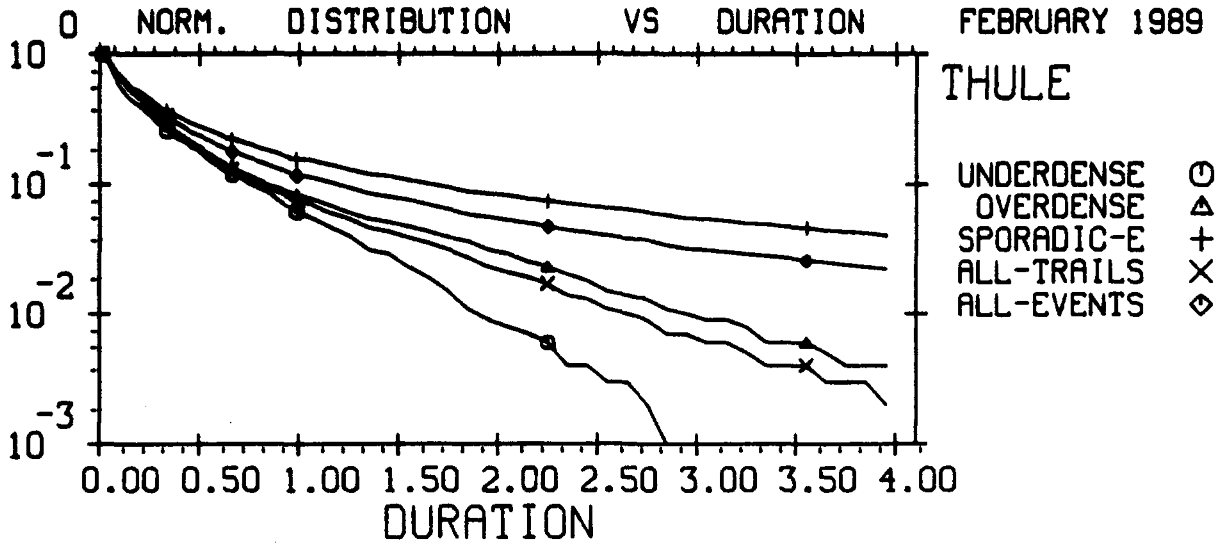
NORM. DISTRIBUTION VS DURATION FEBRUARY 1989




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER - 278. OVER - 90. SPOR-E - 0.
TRAILS - 368. EVENTS - 368.

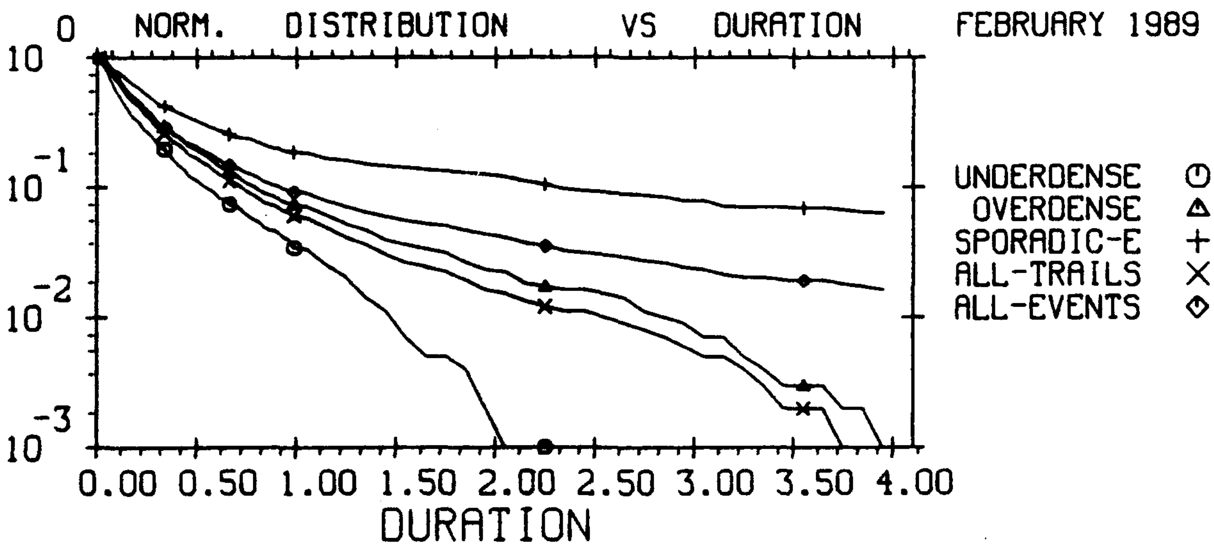
MENU*106,02-4
20-SEP-90
PLOT* 78.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM



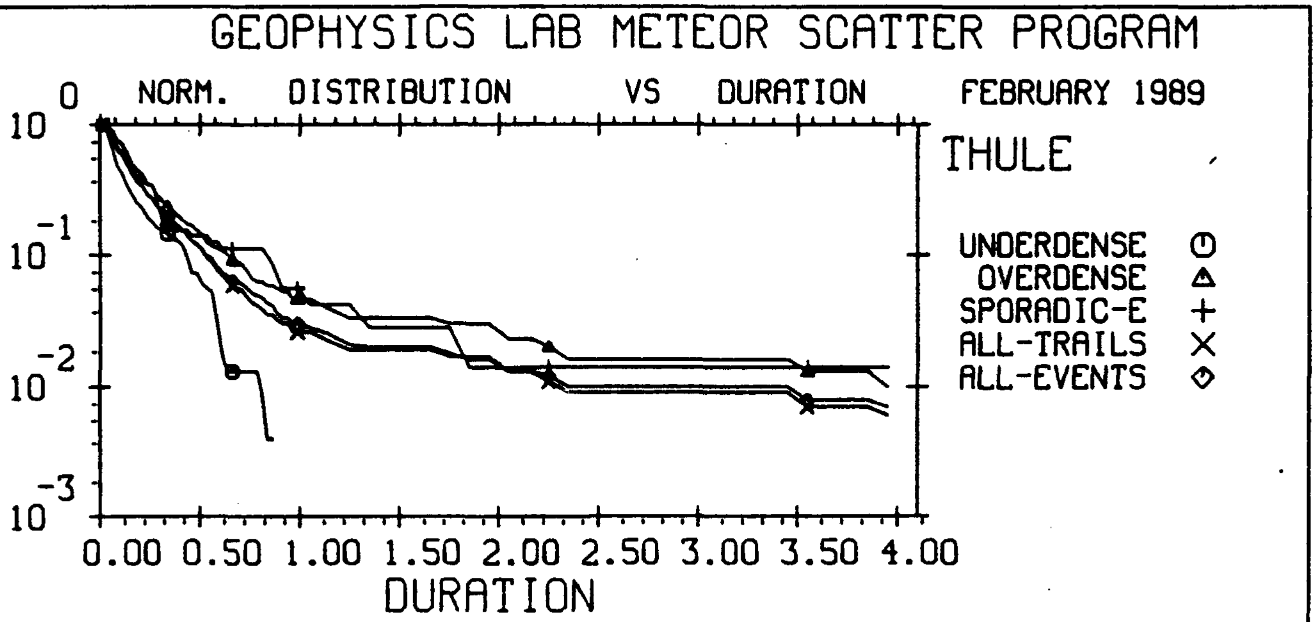

EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER - 1980. OVER - 3622. SPOR-E - 6209.
TRAILS - 5602. EVENTS - 11811.

MENU=106,02-4
20-SEP-90
PLOT= 79.00



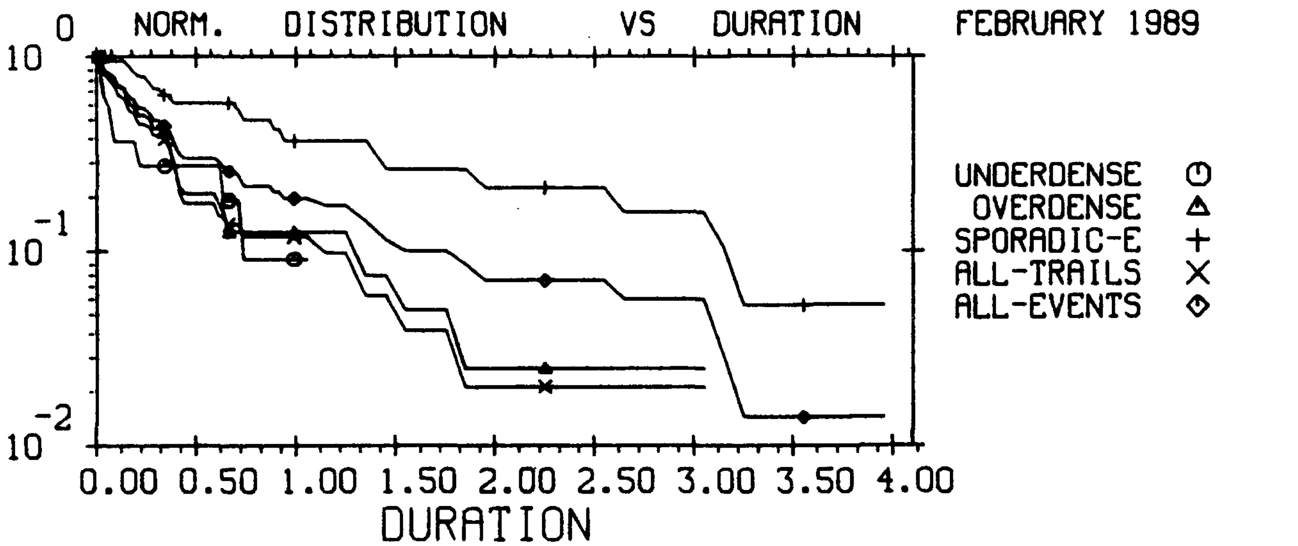

EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER - 1133. OVER - 2289. SPOR-E - 1141.
TRAILS - 3422. EVENTS - 4563.

MENU=106,02-4
20-SEP-90
PLOT= 80.00




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER - 233. OVER - 304. SPOR-E - 71.
TRAILS - 537. EVENTS - 608.

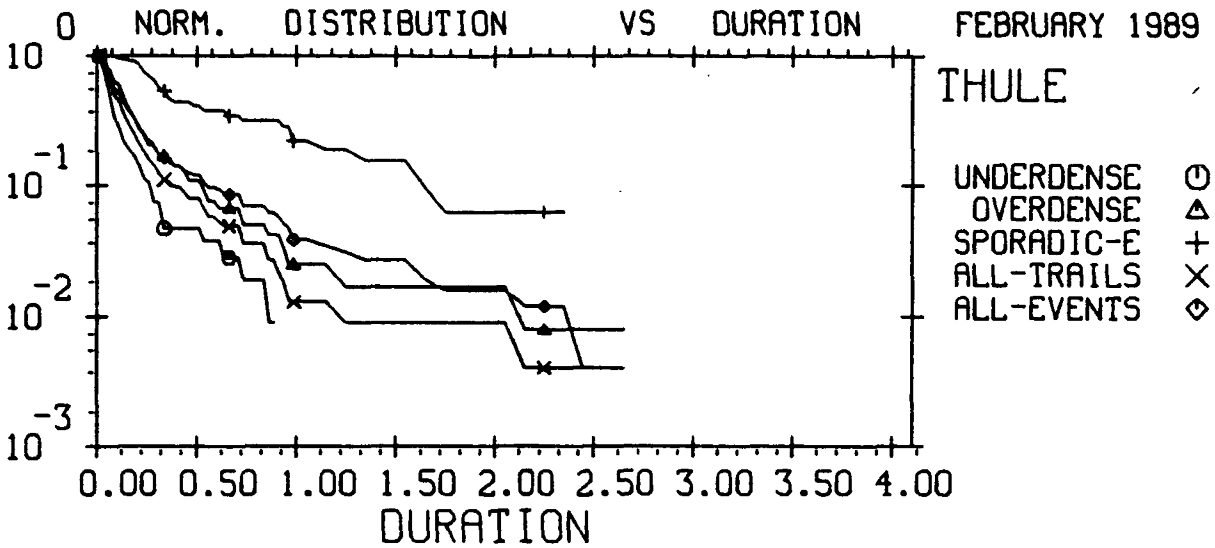
MENU=106,02-4
20-SEP-90
PLOT= 81.00




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER - 11. OVER - 40. SPOR-E - 19.
TRAILS - 51. EVENTS - 70.

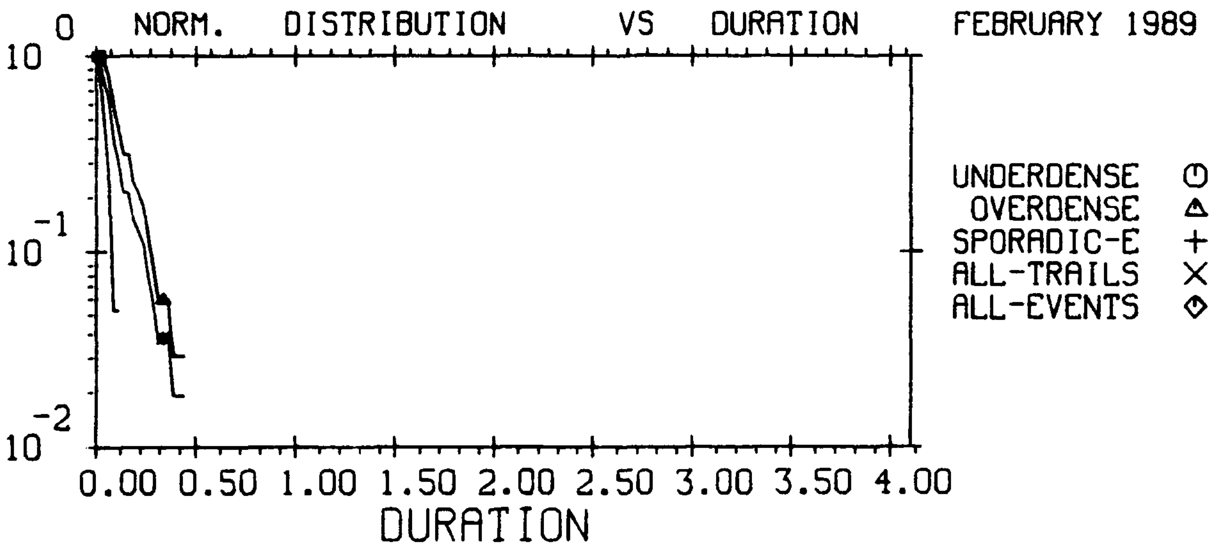
MENU=106,02-4
20-SEP-90
PLOT= 82.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER - 106. OVER - 119. SPOR-E - 32.
TRAILS - 225. EVENTS - 257.

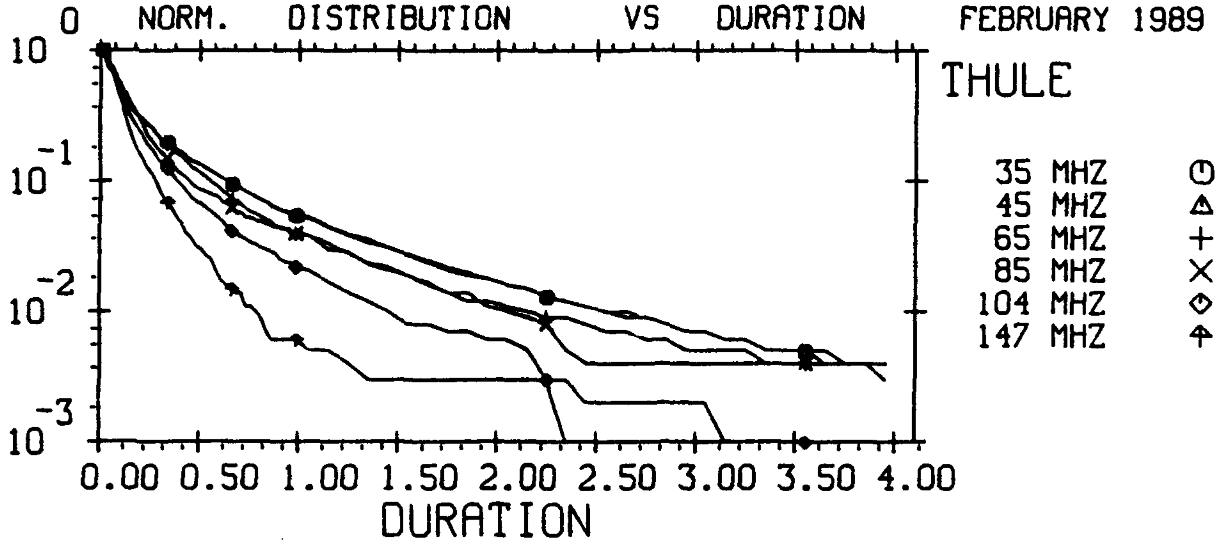
MENU=106,02-4
20-SEP-90
PLOT= 83.00




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER - 20. OVER - 35. SPOR-E - 0.
TRAILS - 55. EVENTS - 55.

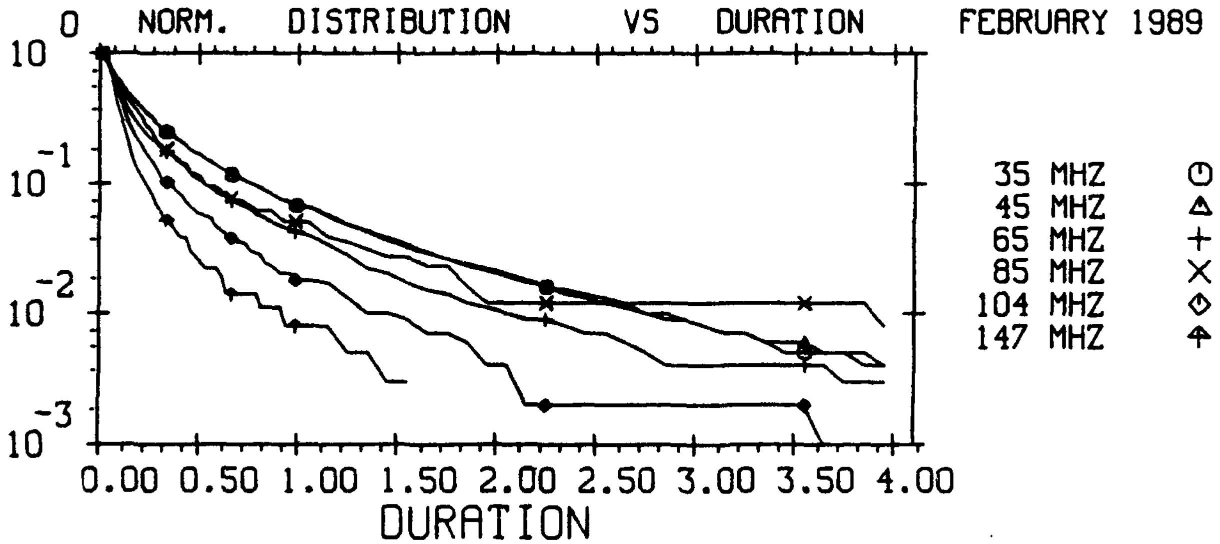
MENU=106,02-4
20-SEP-90
PLOT= 84.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ - 59397. 45MHZ - 36268. 65MHZ - 7922.
85MHZ - 797. 104MHZ - 3772. 147MHZ - 1093.

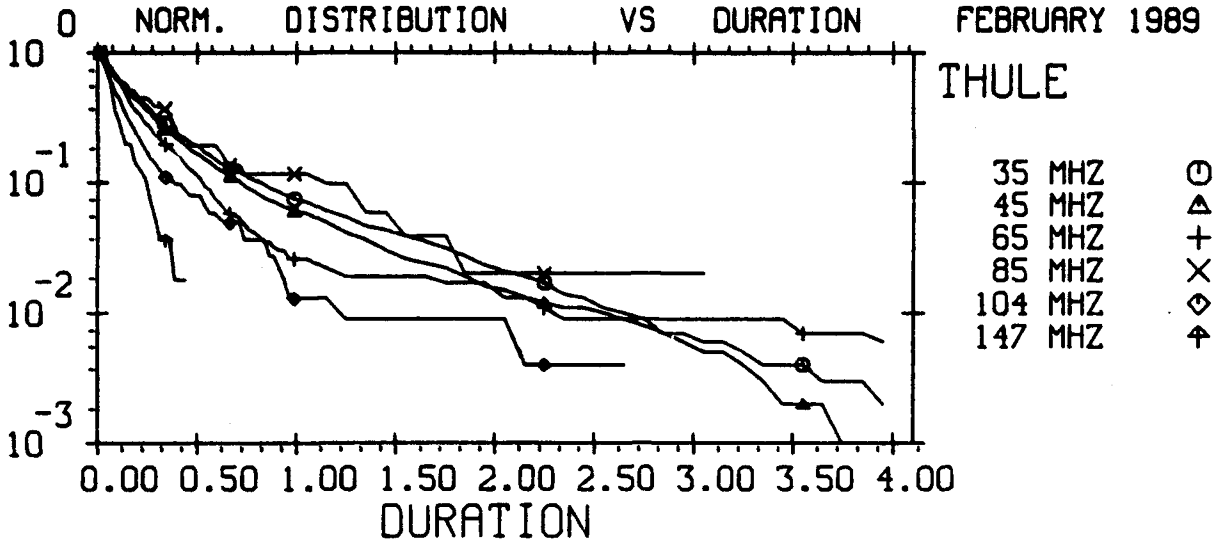
MENU=106,01-4
20-SEP-90
PLOT= 85.00




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ - 24494. 45MHZ - 13596. 65MHZ - 2911.
85MHZ - 257. 104MHZ - 1270. 147MHZ - 368.

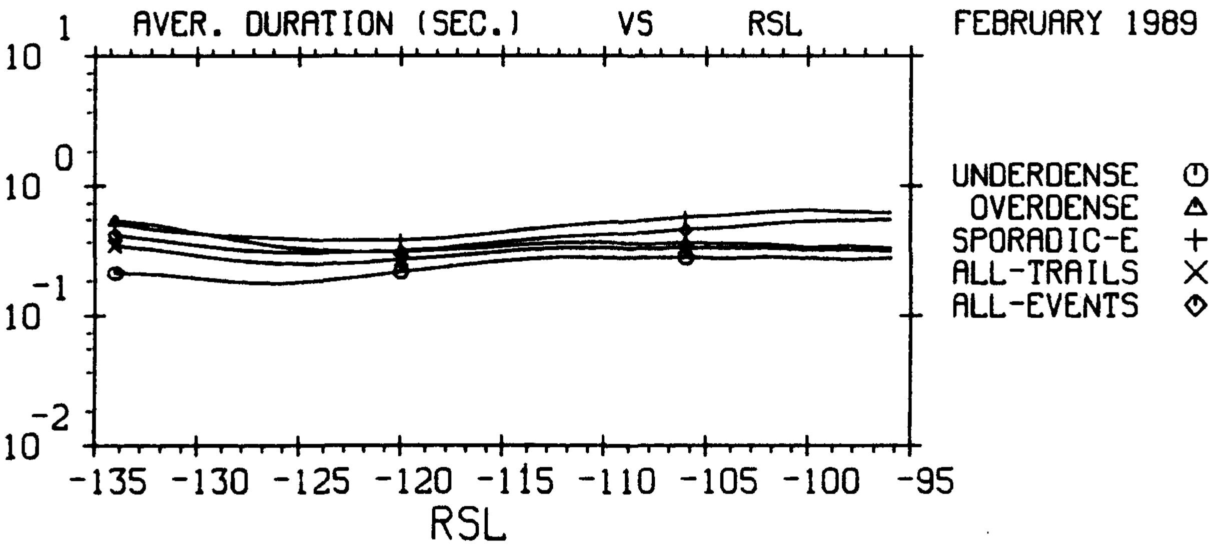
MENU=106,01-4
20-SEP-90
PLOT= 86.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ - 5602. 45MHZ - 3422. 65MHZ - 537.
85MHZ - 51. 104MHZ - 225. 147MHZ - 55.

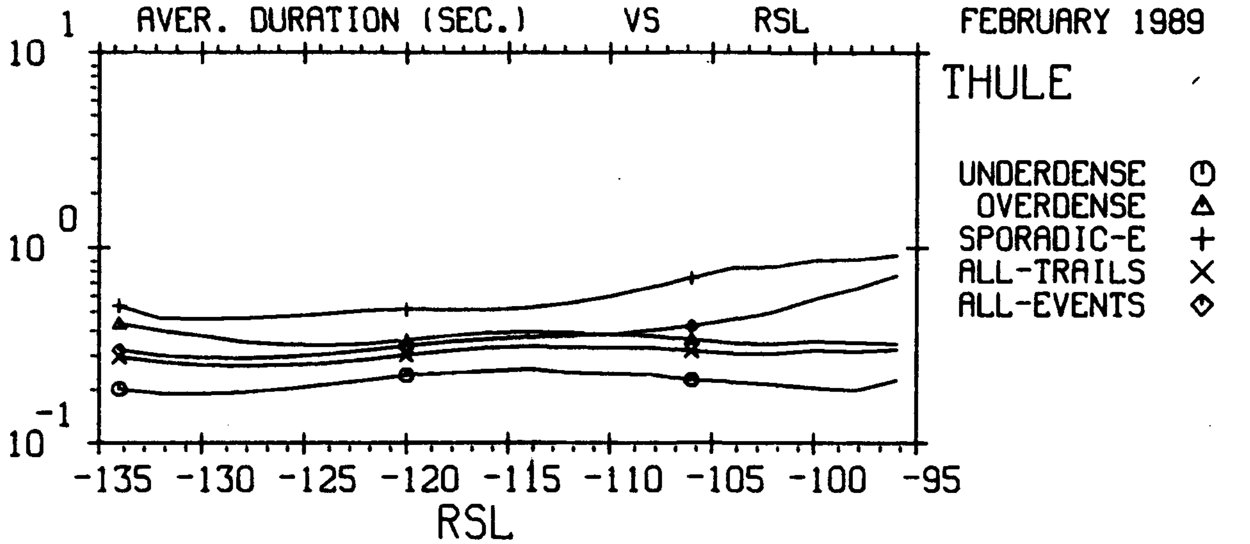
MENU*106,01-4
20-SEP-90
PLOT* 87.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ

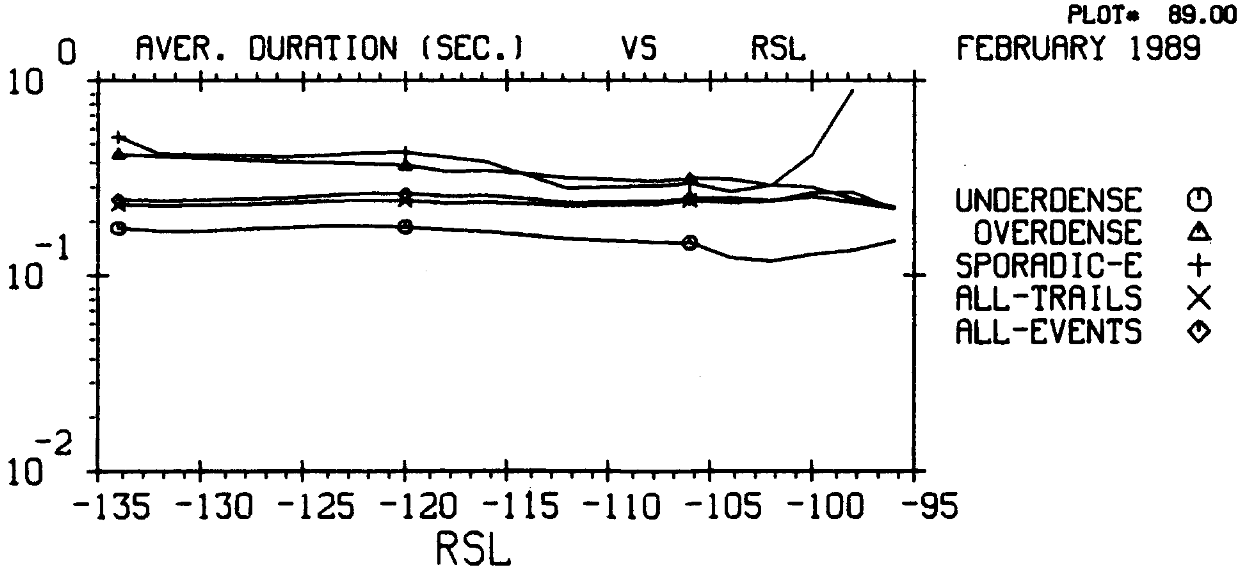
MENU*106,06-1
20-SEP-90
PLOT* 88.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ

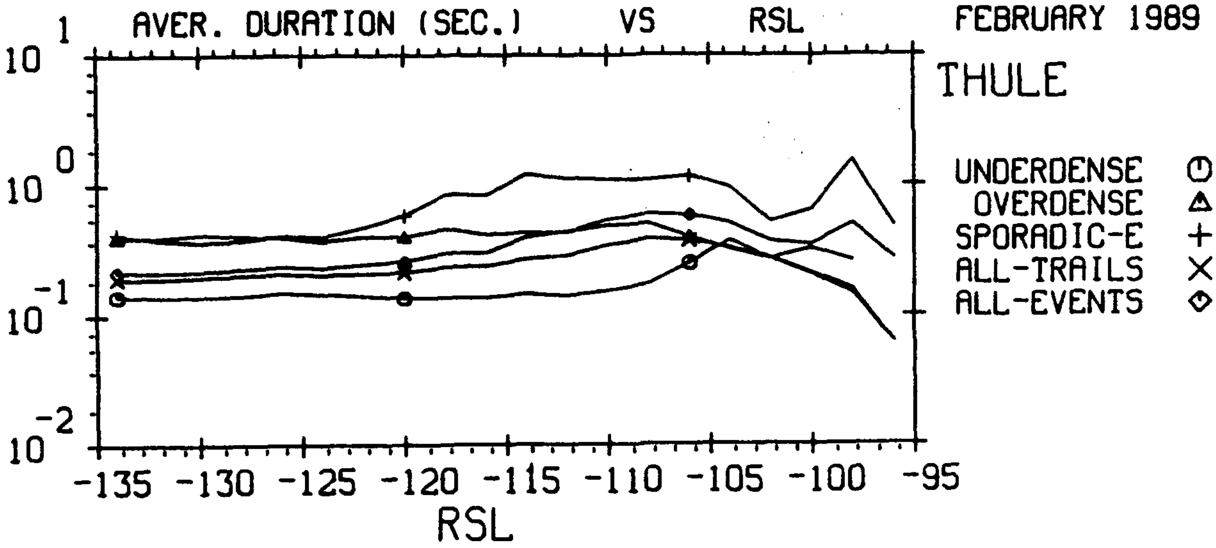
MENU=106,06-1
20-SEP-90
PLOT= 89.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ

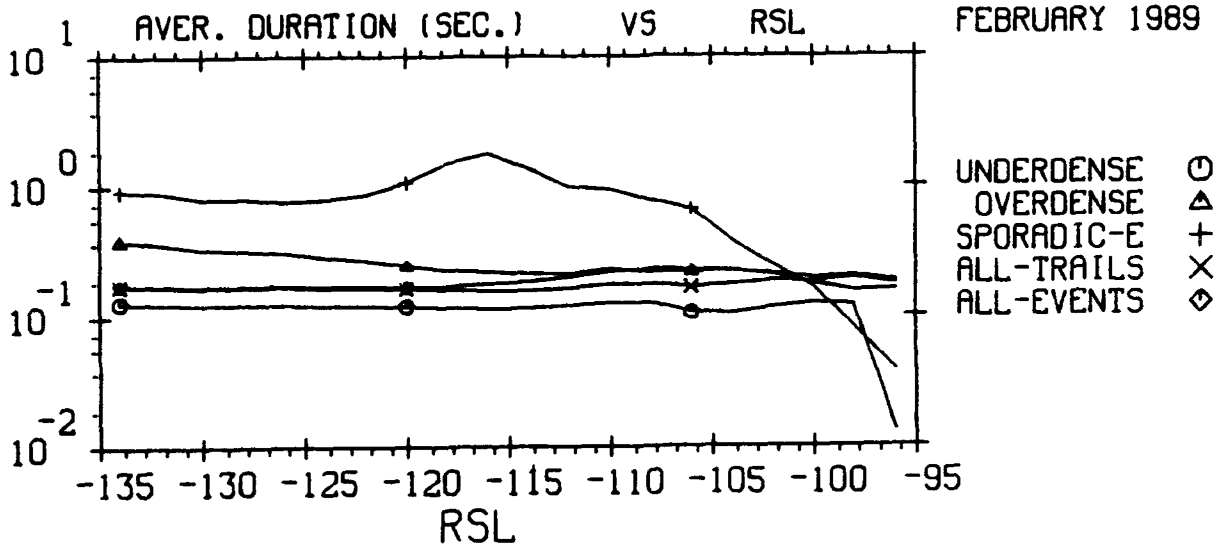
MENU=106,06-1
20-SEP-90
PLOT= 90.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ

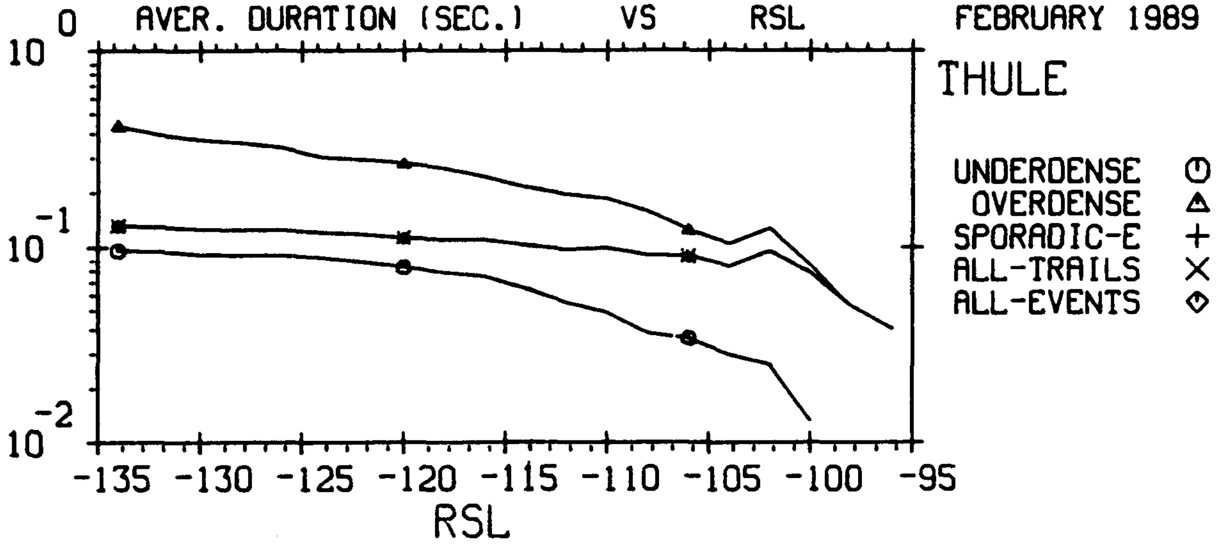
MENU#106,06-1
20-SEP-90
PLOT# 91.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ

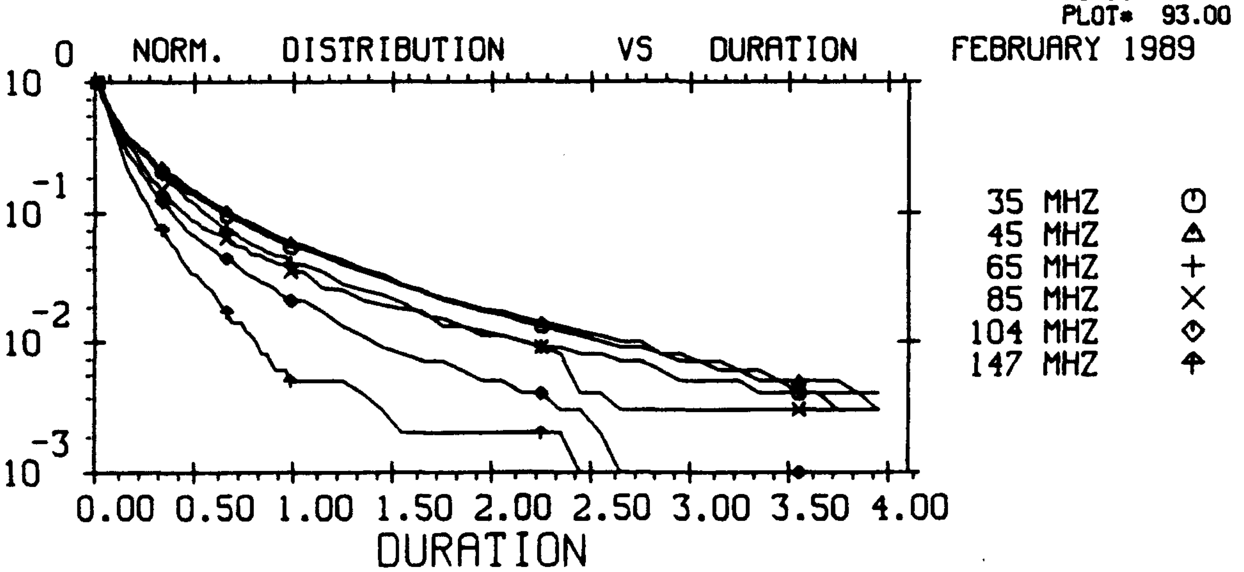
MENU#106,06-1
20-SEP-90
PLOT# 92.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ

MENU#106,06-1
20-SEP-90
PLOT# 93.00

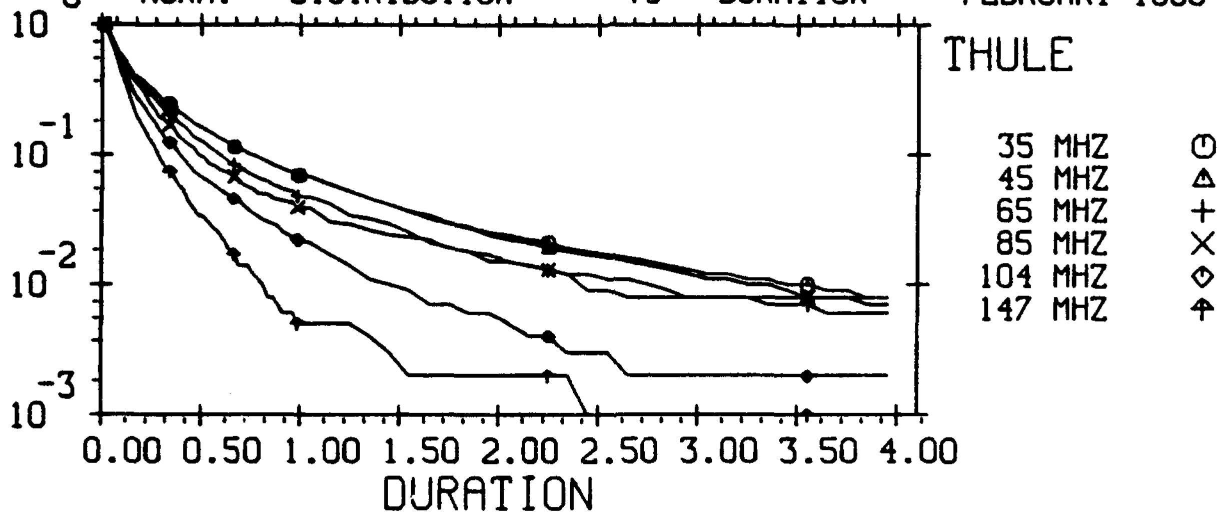



EXCEEDING 19.0 DB SNR
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH = 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL
NORMALIZING FACTORS:
35MHZ - 46635. 45MHZ - 25624. 65MHZ - 6757.
85MHZ - 908. 104MHZ - 4424. 147MHZ - 1313.

MENU#107,01-4
20-SEP-90
PLOT# 94.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

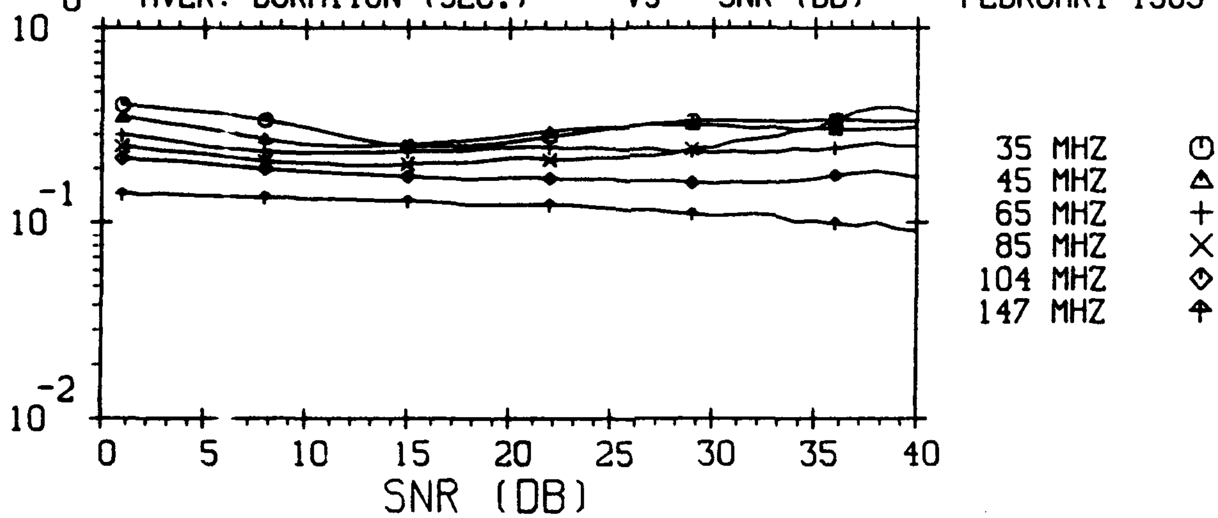
NORM. DISTRIBUTION VS DURATION FEBRUARY 1989




EXCEEDING 19.0 DB SNR
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH = 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL
NORMALIZING FACTORS:
35MHZ - 78691. 45MHZ - 30143. 65MHZ - 7424.
85MHZ - 1057. 104MHZ - 4445. 147MHZ - 1313.

MENU=107,01-4
20-SEP-90
PLOT= 95.00

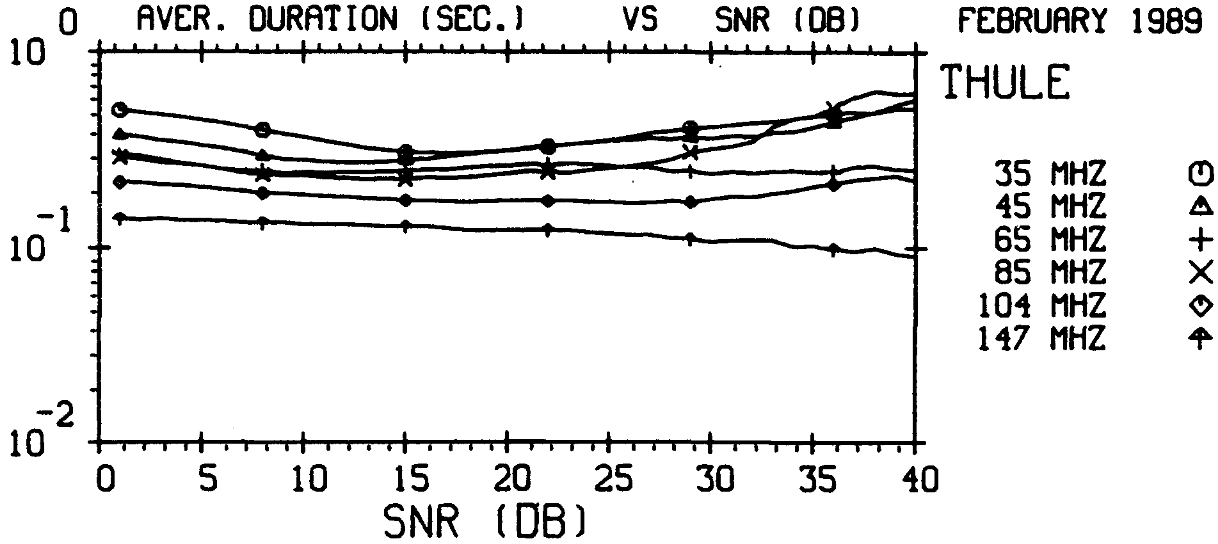
AVER. DURATION (SEC.) VS SNR (DB) FEBRUARY 1989




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH = 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

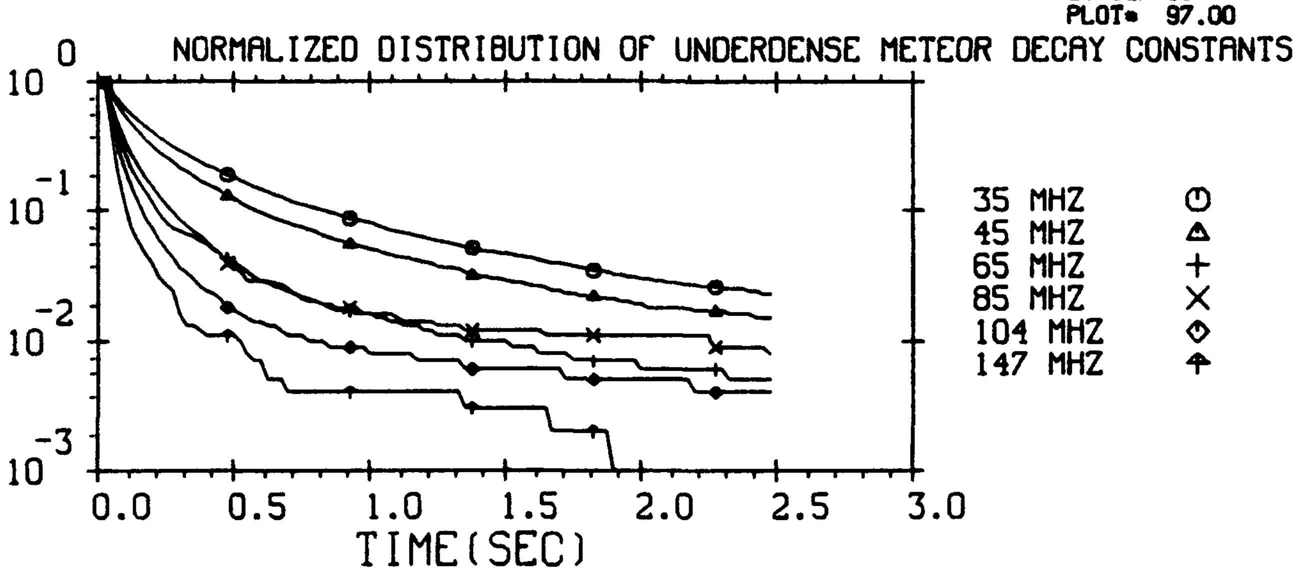
MENU=107,05-1
20-SEP-90
PLOT= 96.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

MENU=107,05-1
20-SEP-90
PLOT= 97.00

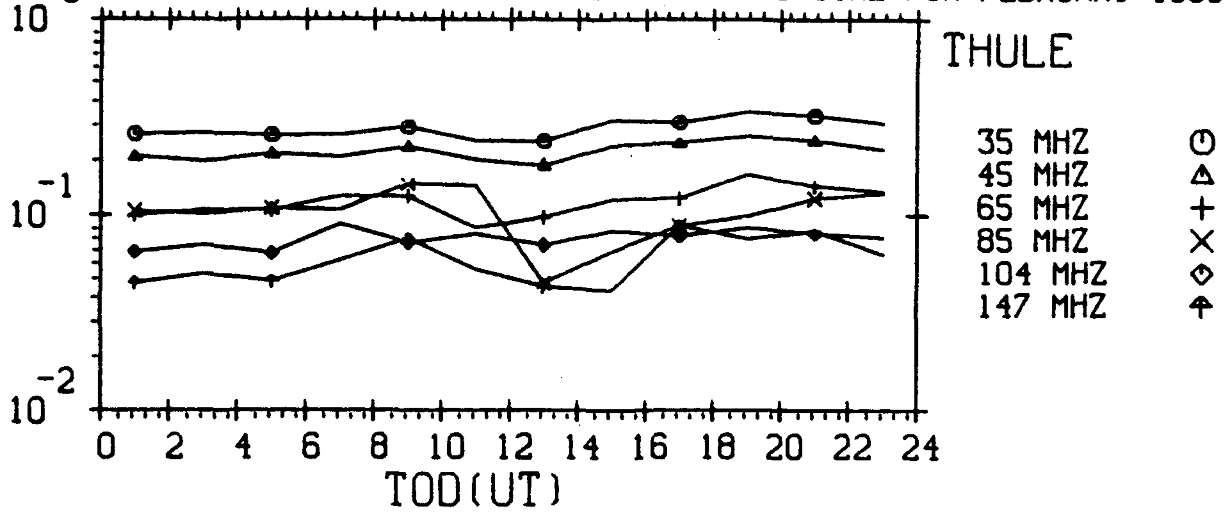



FEBRUARY 1989
THE TIME OF DAY IS 0 : 24 HOURS U.T.
NORMALIZING FACTORS:
35MHZ : 14875. 45MHZ : 13257. 65MHZ : 6177.
85MHZ : 857. 104MHZ : 3685. 147MHZ : 1113.

MENU=108,01-4
20-SEP-90
PLOT= 98.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

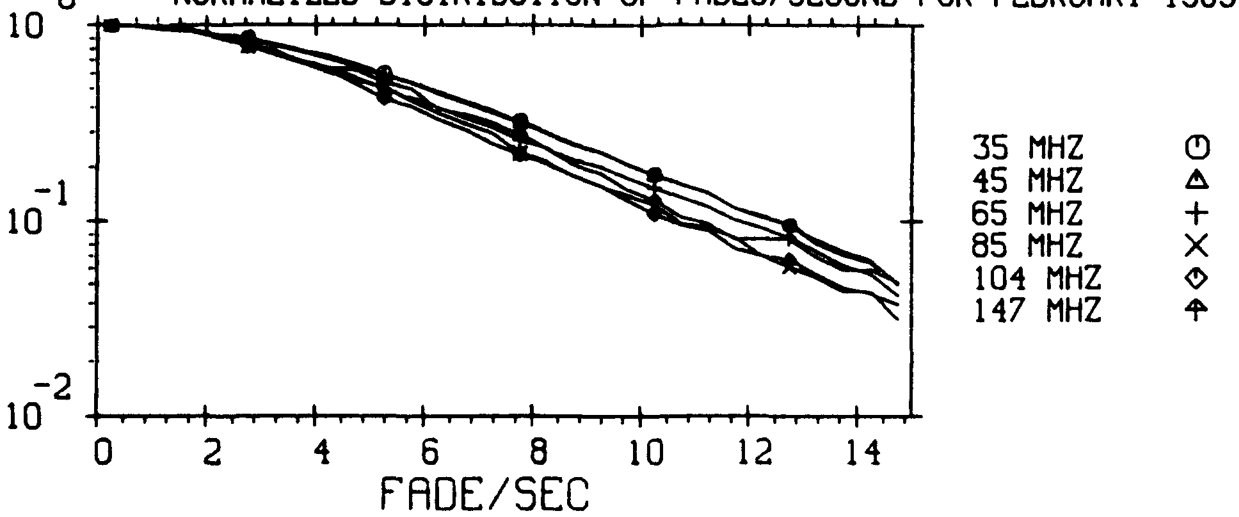
AVERAGE UNDERDENSE TIME CONSTANT VS TIME FOR FEBRUARY 1989




THE 24 HOUR AVERAGE TIME CONSTANTS ARE
0.271 0.212 0.116 0.100 0.076 0.059

MENU=108,02-1
20-SEP-90
PLOT= 99.00

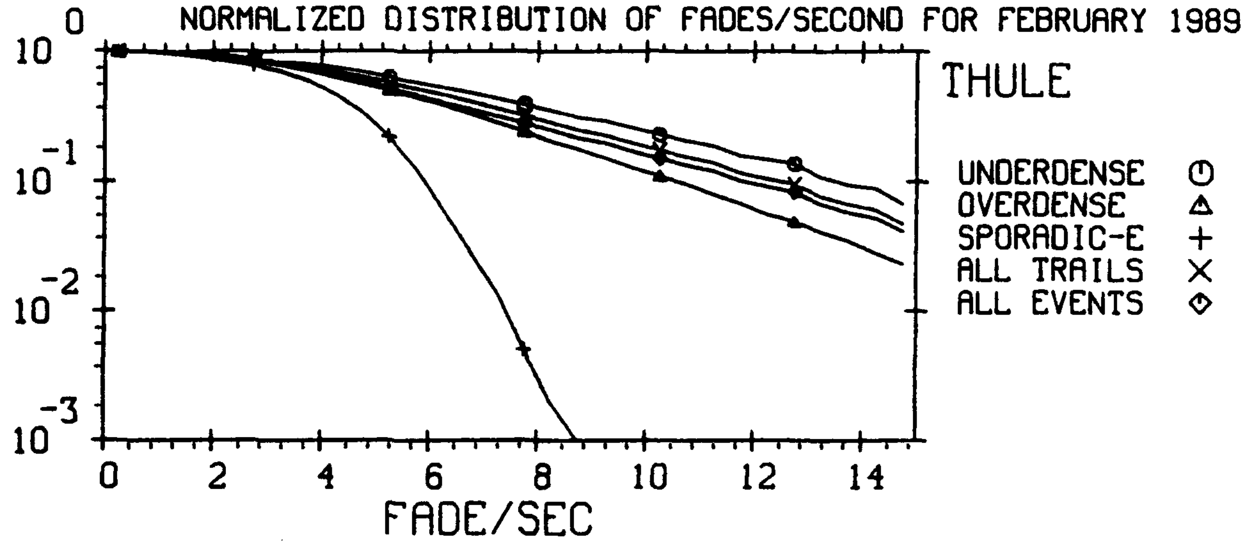
NORMALIZED DISTRIBUTION OF FADES/SECOND FOR FEBRUARY 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ : 16686. 45MHZ : 12421. 65MHZ : 2542.
85MHZ : 257. 104MHZ : 807. 147MHZ : 124.

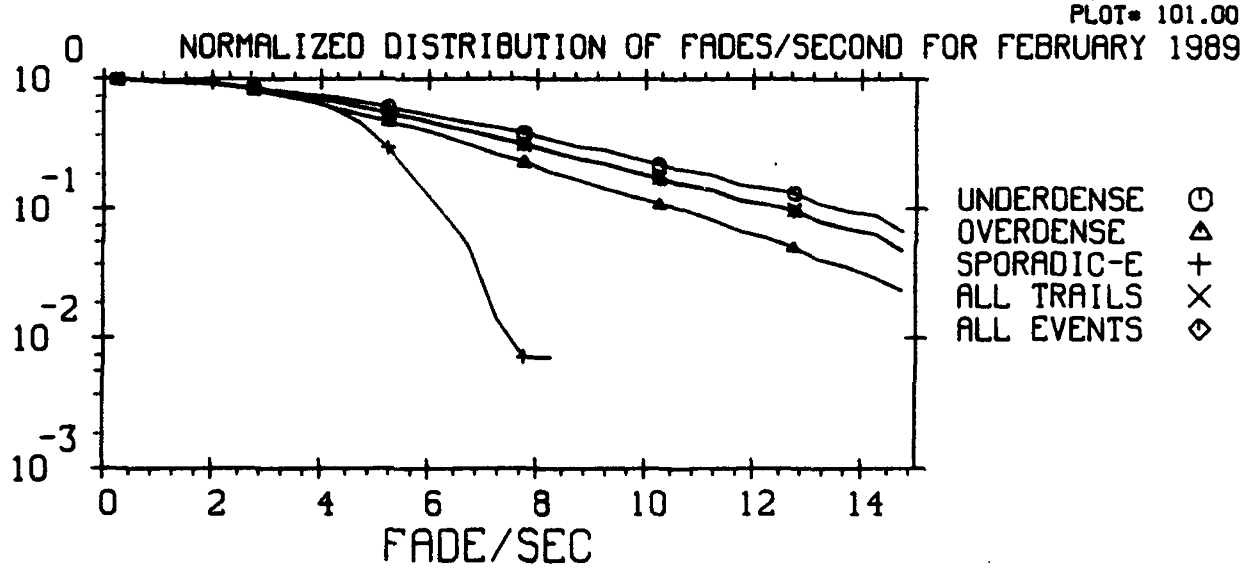
MENU=109,01-4
20-SEP-90
PLOT= 100.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER : 9003. OVER : 7683. SPOR-E : 2582.
TRAILS : 16686. EVENTS : 19268.

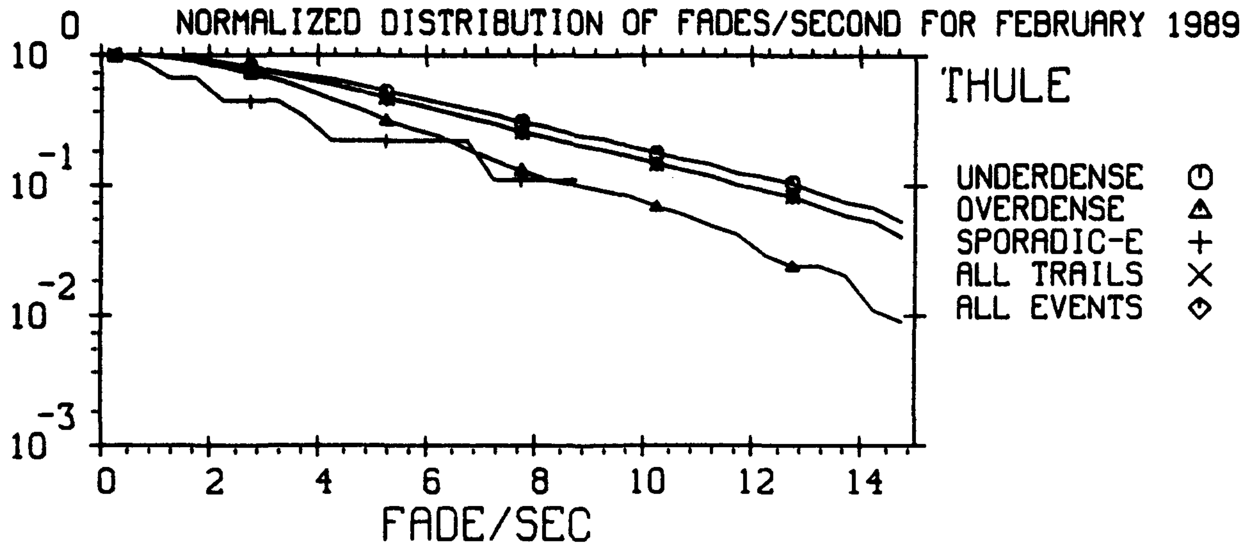
MENU=109,02-4
20-SEP-90
PLOT= 101.00




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER : 7176. OVER : 5245. SPOR-E : 138.
TRAILS : 12421. EVENTS : 12559.

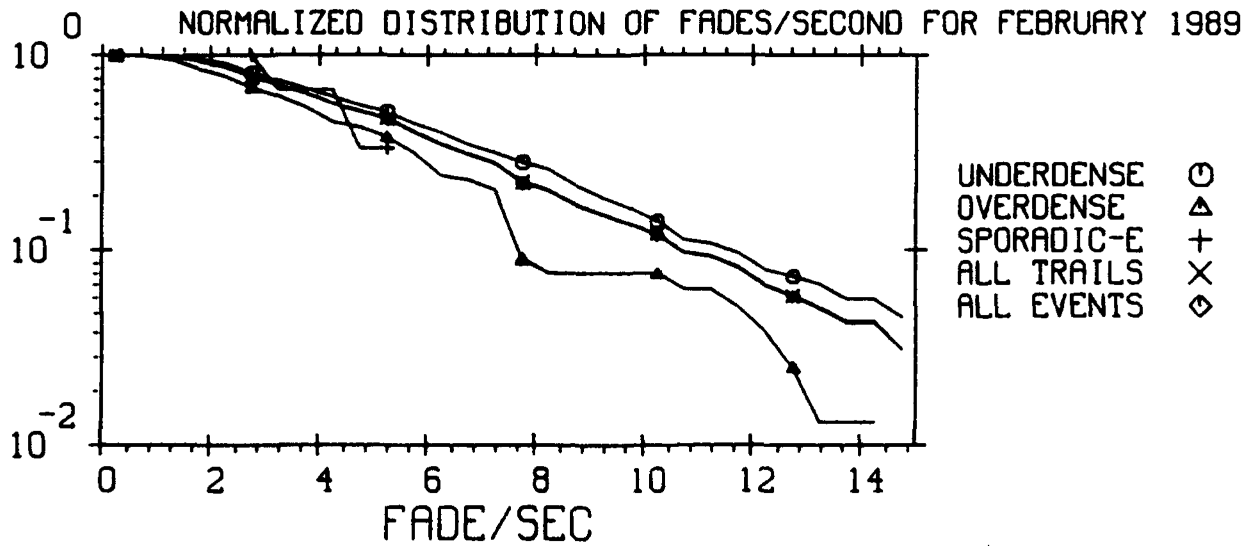
MENU=109,02-4
20-SEP-90
PLOT= 102.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER : 1846. OVER : 696. SPOR-E : 9.
TRAILS : 2542. EVENTS : 2551.

MENU*109,02-4
20-SEP-90
PLOT* 103.00

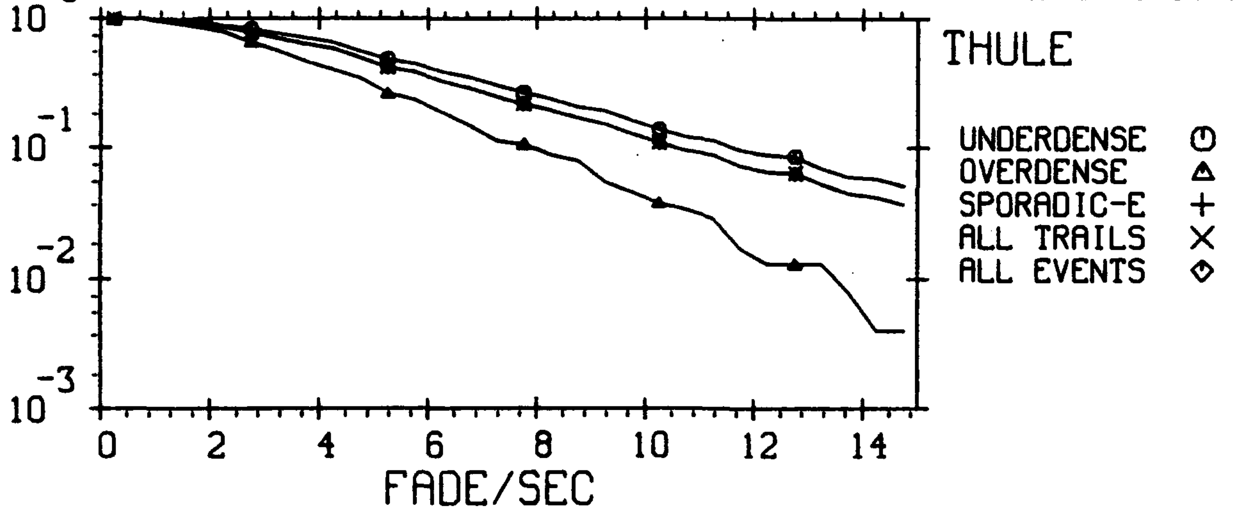



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER : 178. OVER : 79. SPOR-E : 3.
TRAILS : 257. EVENTS : 260.

MENU*109,02-4
20-SEP-90
PLOT* 104.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

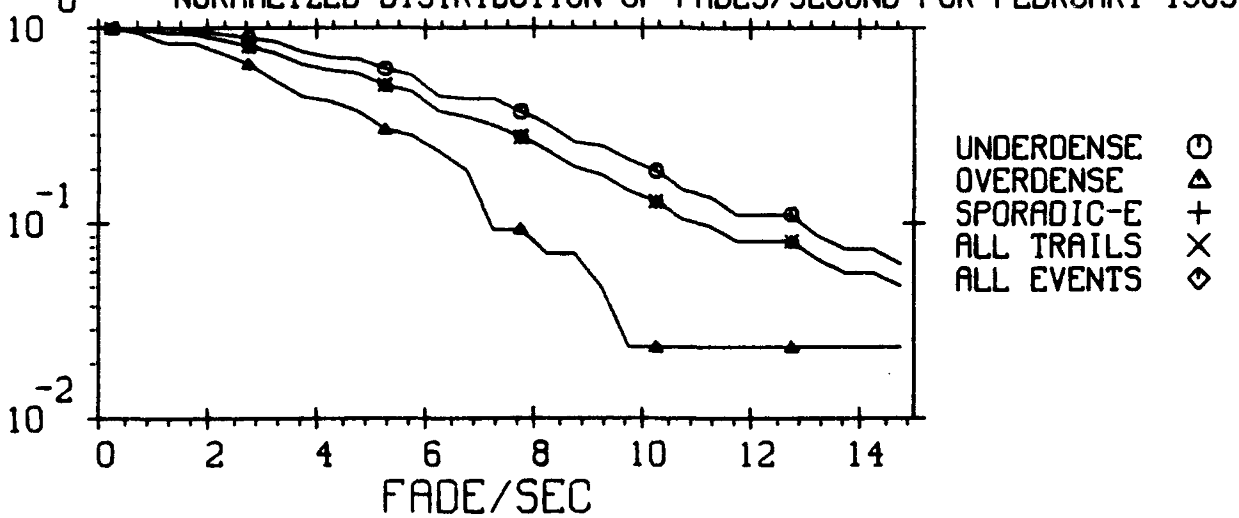
NORMALIZED DISTRIBUTION OF FADES/SECOND FOR FEBRUARY 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER : 569. OVER : 238. SPOR-E : 1.
TRAILS : 807. EVENTS : 807.

MENU=109,02-4
20-SEP-90
PLOT= 105.00

NORMALIZED DISTRIBUTION OF FADES/SECOND FOR FEBRUARY 1989

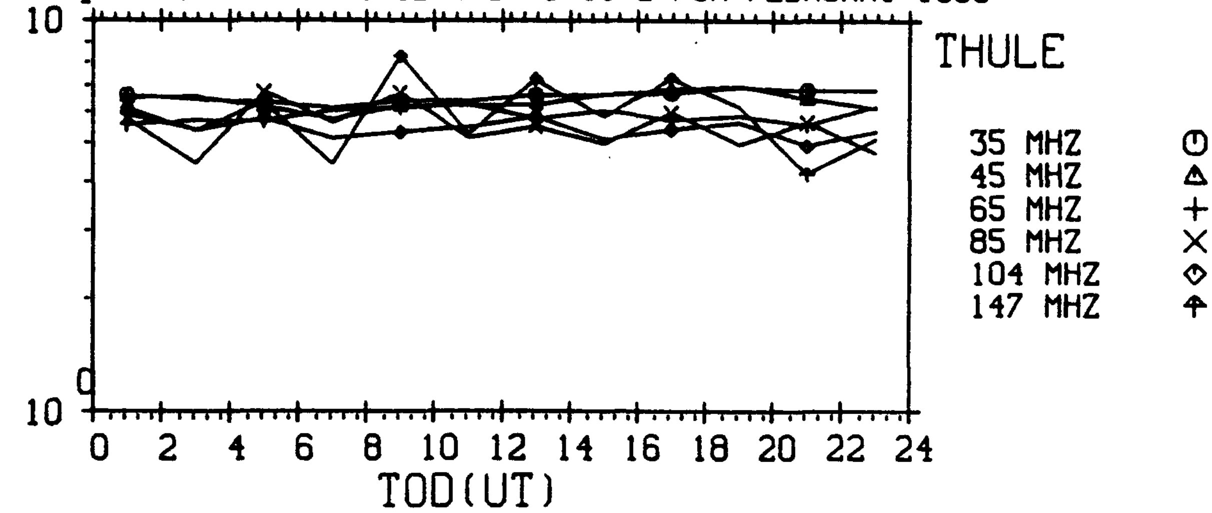



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER : 81. OVER : 43. SPOR-E : 1.
TRAILS : 124. EVENTS : 124.

MENU=109,02-4
20-SEP-90
PLOT= 106.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

AVERAGE FADES/SECOND VS TIME FOR FEBRUARY 1989

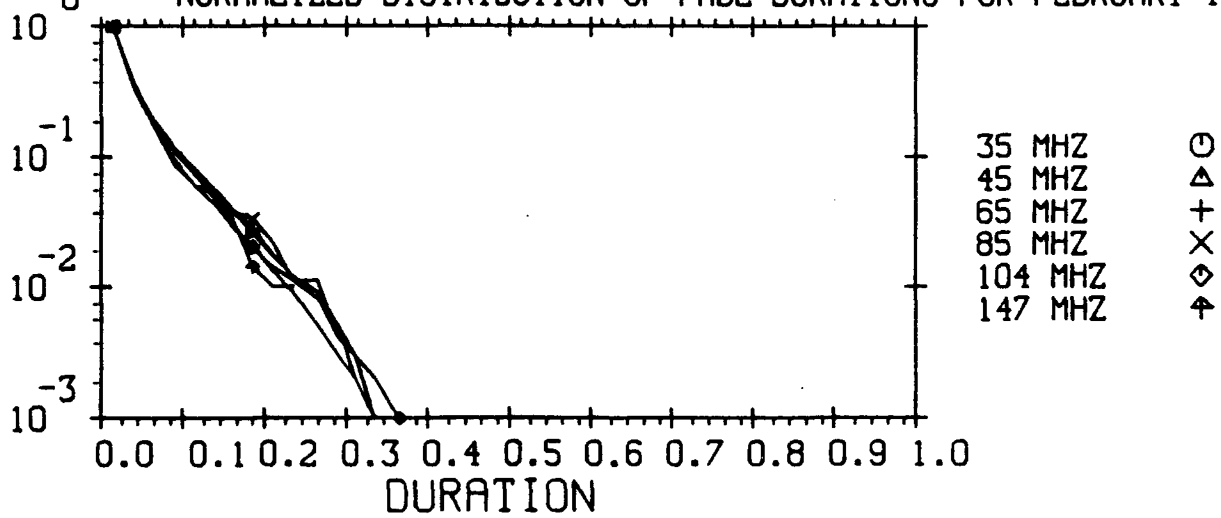



THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
THE 24 HOUR FADES/SECOND AVERAGES ARE:

| | | | | | |
|---|---|---|---|---|---|
| 6.347 | 6.250 | 5.706 | 5.435 | 5.311 | 5.710 |

MENU*109,07-1
20-SEP-90
PLOT* 107.00

NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR FEBRUARY 1989

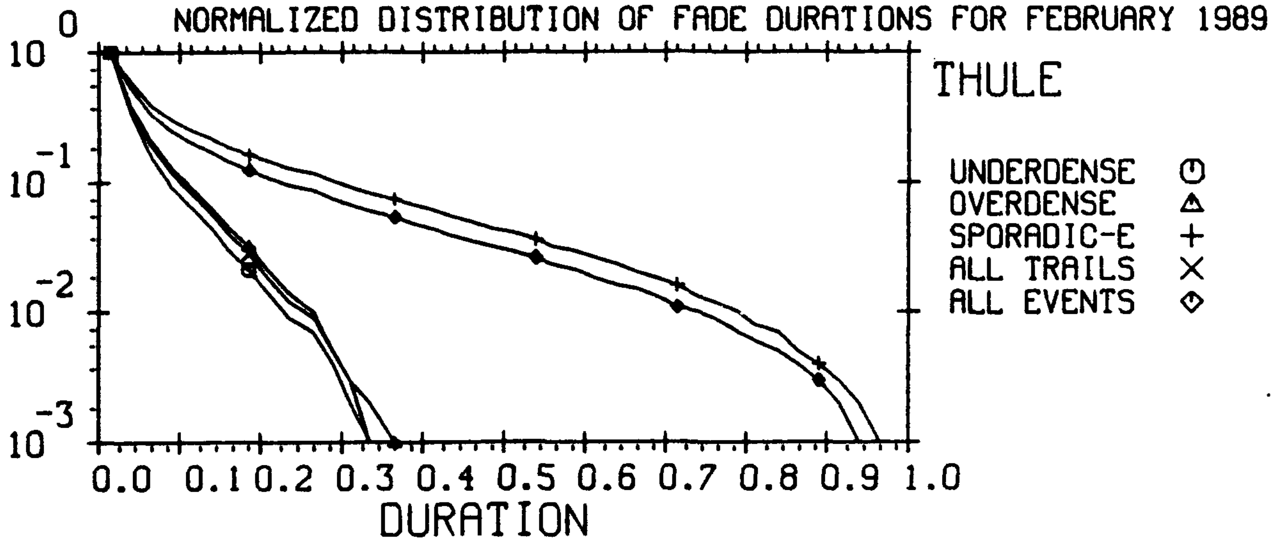



THE TIME OF DAY IS 0 : 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:

| | | | | | |
|---|---|---|---|---|---|
| 35MHZ : | 81782. | 45MHZ : | 56903. | 65MHZ : | 8893. |
| 85MHZ : | 820. | 104MHZ : | 2424. | 147MHZ : | 295. |

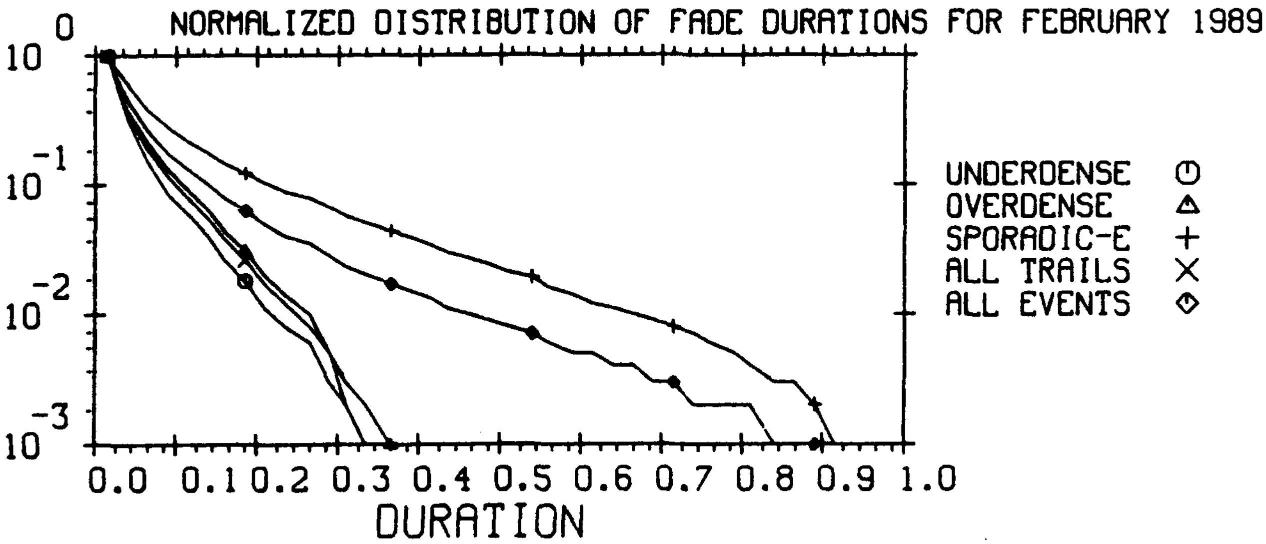
MENU*109,05-4
20-SEP-90
PLOT* 108.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER : 27986. OVER : 53796. SPOR-E : 201737.
TRAILS : 81782. EVENTS : 283519.

MENU=109,06-4
20-SEP-90
PLOT= 109.00

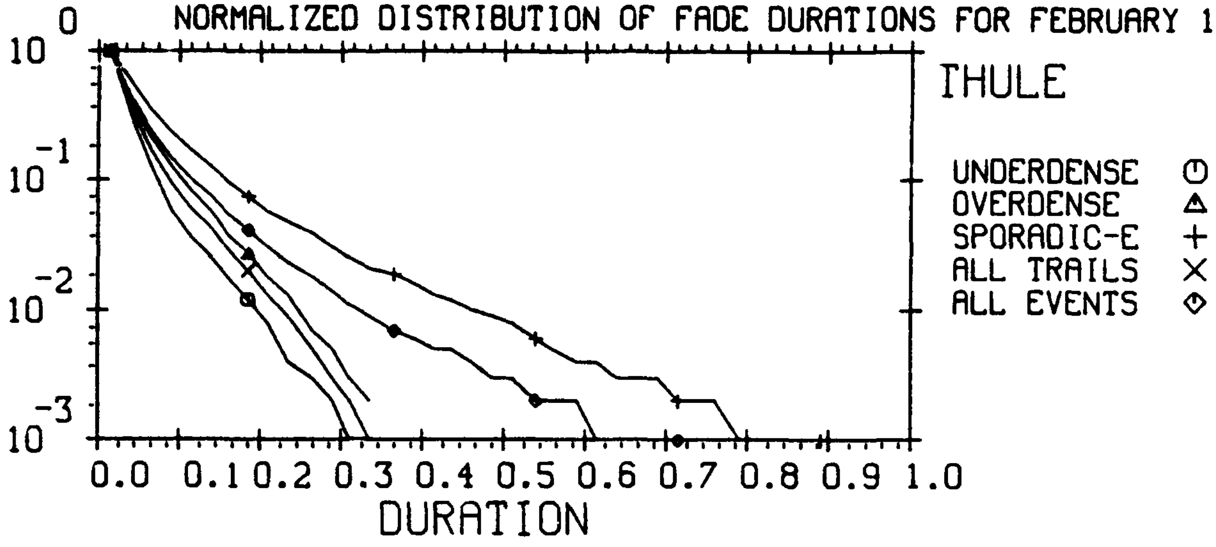



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER : 20845. OVER : 36058. SPOR-E : 34426.
TRAILS : 56903. EVENTS : 91329.

MENU=109,06-4
20-SEP-90
PLOT= 110.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

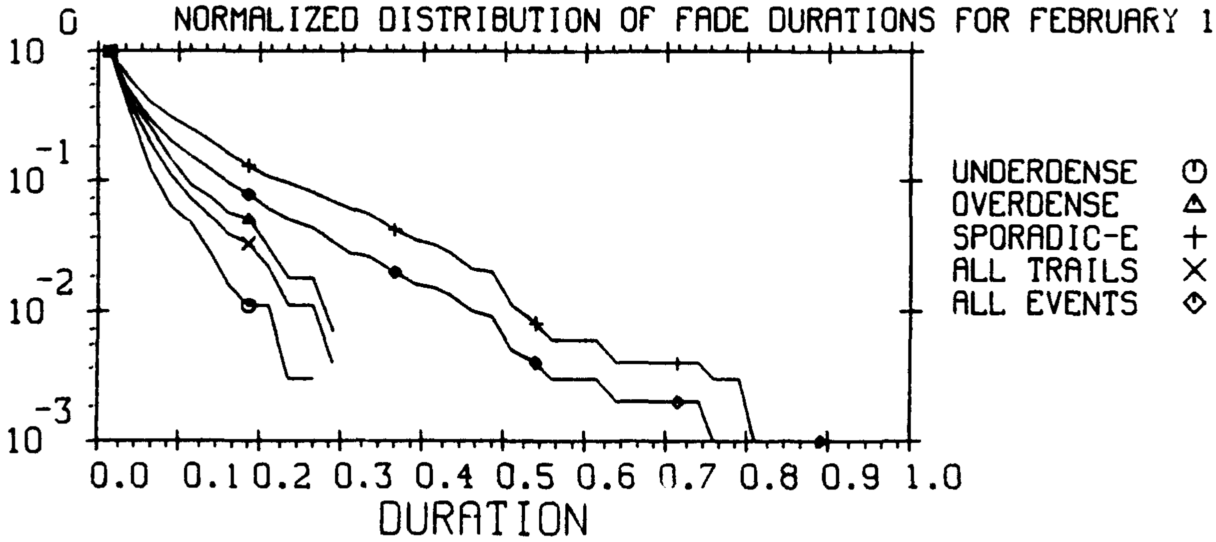
NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR FEBRUARY 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER : 4337. OVER : 4556. SPOR-E : 5562.
TRAILS : 8893. EVENTS : 14455.

MENU=109,06-4
20-SEP-90
PLOT= 111.00

NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR FEBRUARY 1989

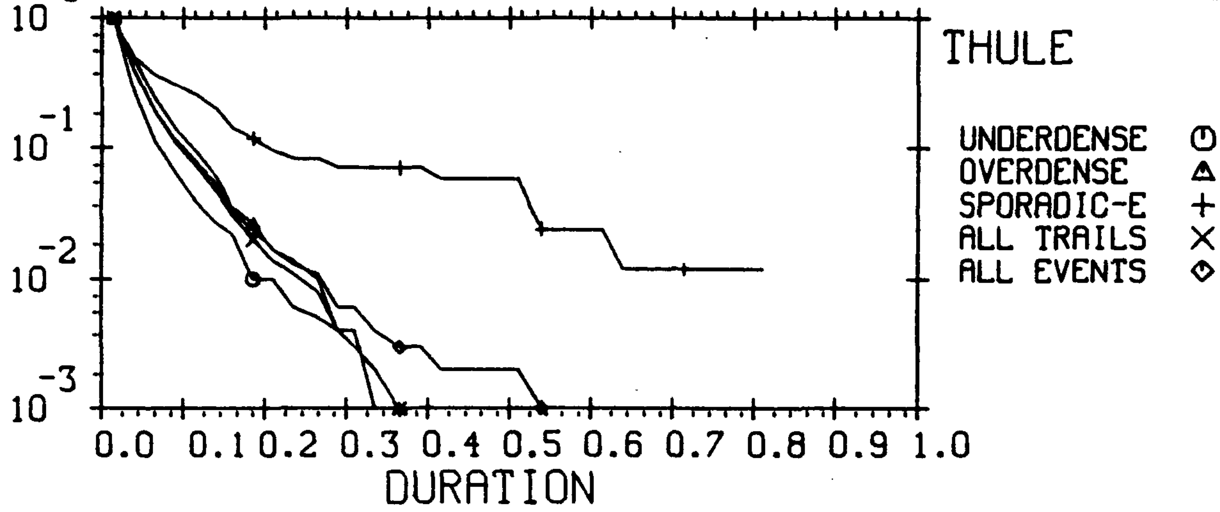



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER : 365. OVER : 455. SPOR-E : 708.
TRAILS : 820. EVENTS : 1528.

MENU=109,06-4
20-SEP-90
PLOT= 112.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

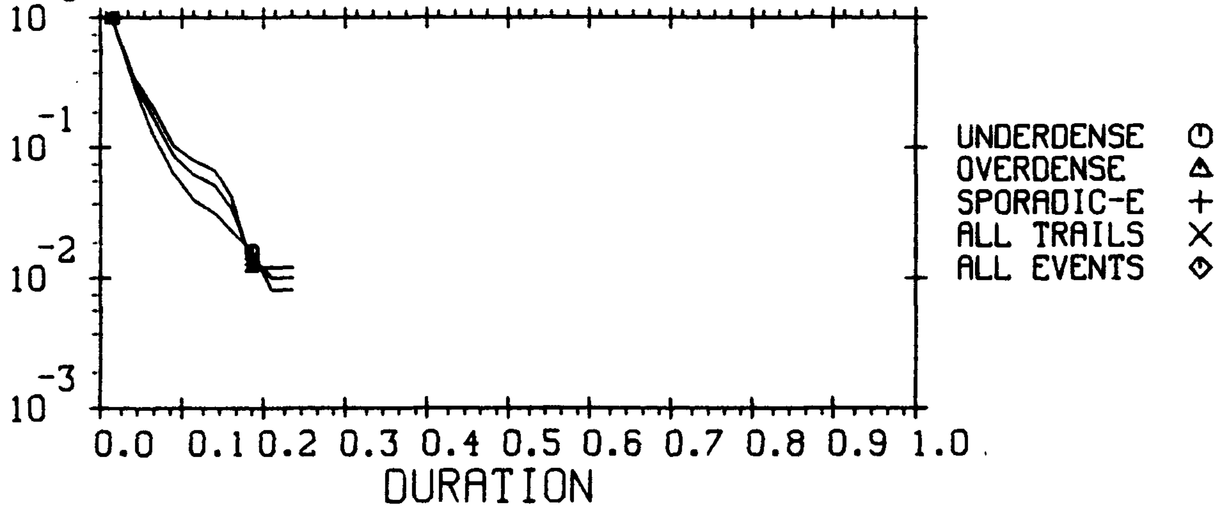
NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR FEBRUARY 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER : 986. OVER : 1438. SPOR-E : 85.
TRAILS : 2424. EVENTS : 2509.

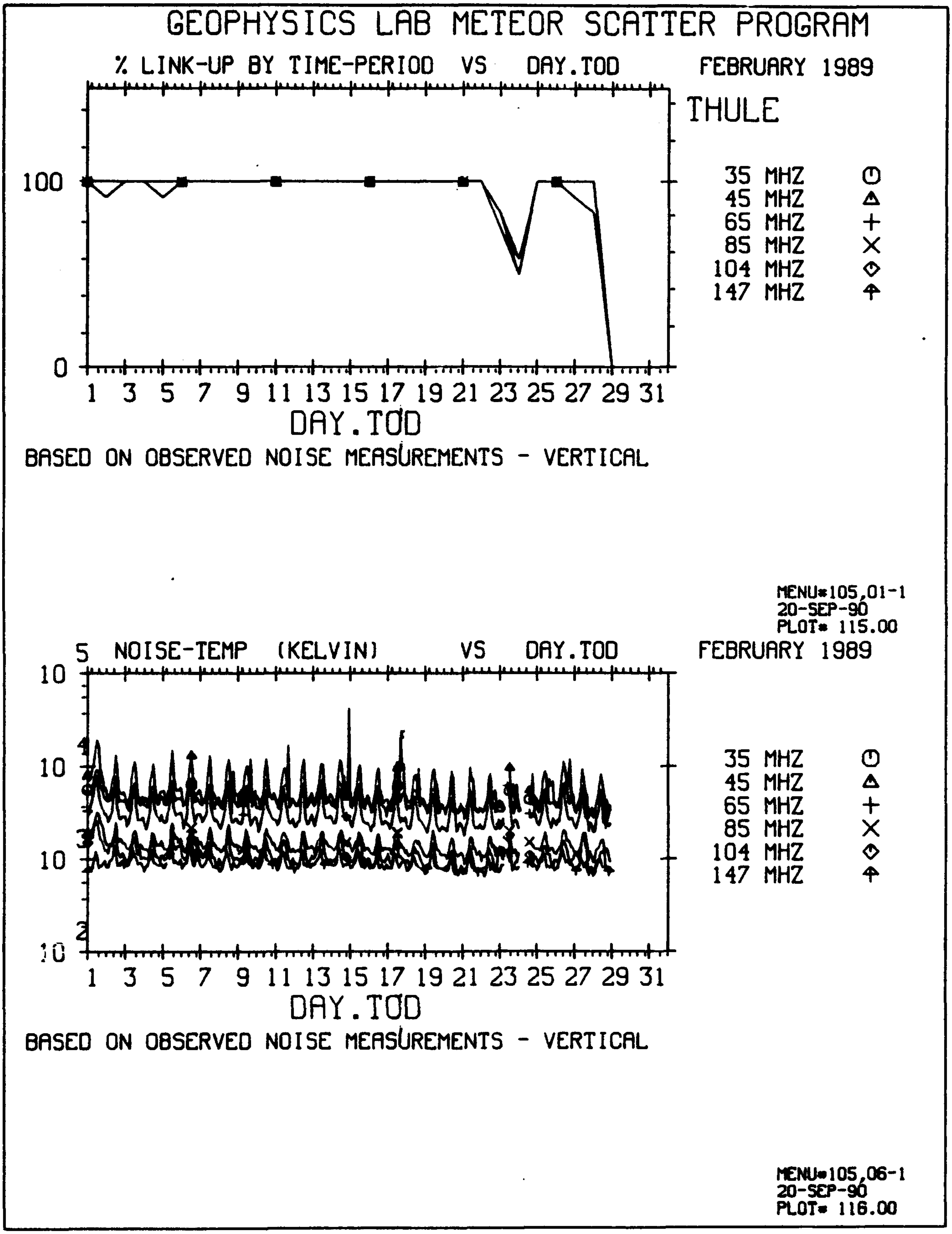
MENU=109,06-4
20-SEP-90
PLOT= 113.00

NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR FEBRUARY 1989



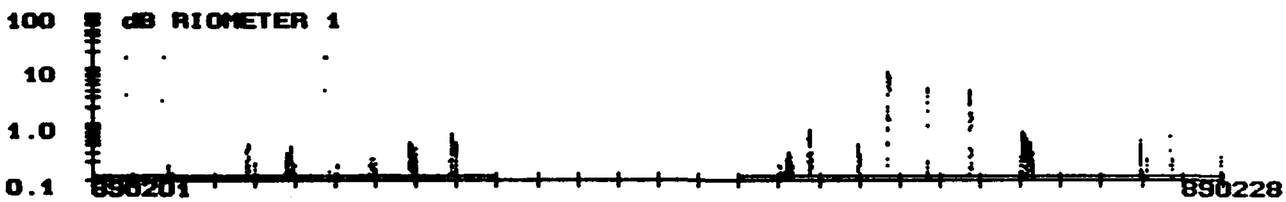

THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER : 129. OVER : 166. SPOR-E : 1.
TRAILS : 295. EVENTS : 295.

MENU=109,06-4
20-SEP-90
PLOT= 114.00


GEOPHYSICS LAB METEOR SCATTER PROGRAM
% LINK-UP BY TIME-PERIOD VS DAY.TOD
FEBRUARY 1989
THULE
100
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
DAY.TOD
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL
35 MHZ
45 MHZ
65 MHZ
85 MHZ
104 MHZ
147 MHZ
MENU=105,01-1
20-SEP-90
PLOT= 115.00
NOISE-TEMP (KELVIN) VS DAY.TOD
FEBRUARY 1989
10^5
10^4
10^3
10^2
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
DAY.TOD
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL
35 MHZ
45 MHZ
65 MHZ
85 MHZ
104 MHZ
147 MHZ
MENU=105,06-1
20-SEP-90
PLOT= 116.00

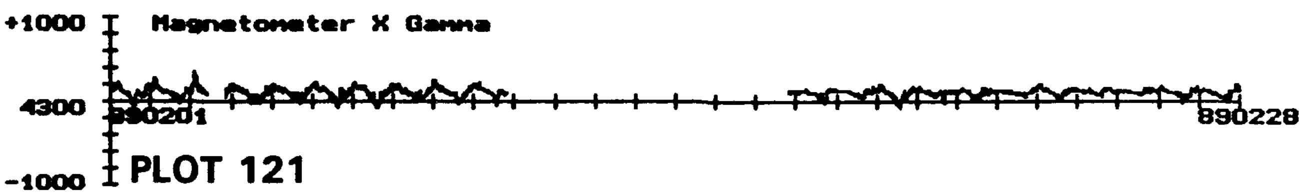

PLOT 117

PLOT 118 RIOMETER 2 DATA UNAVAILABLE

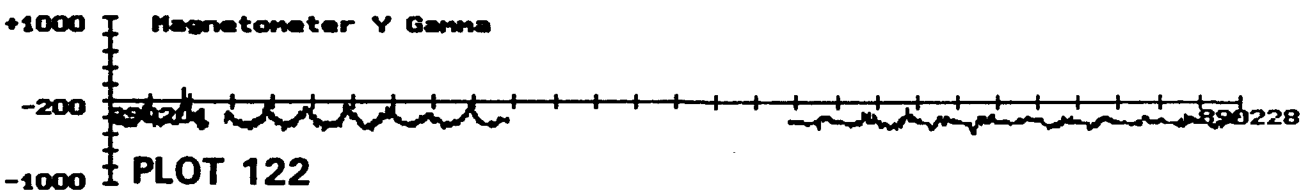



PLOT 119

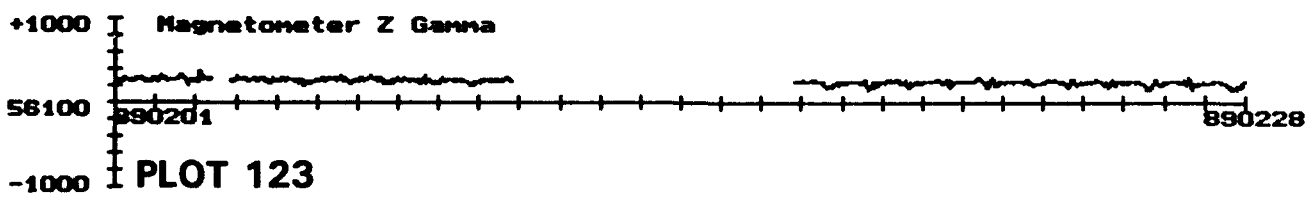
PLOT 120 RIOMETER 2 DATA UNAVAILABLE




PLOT 121




PLOT 122

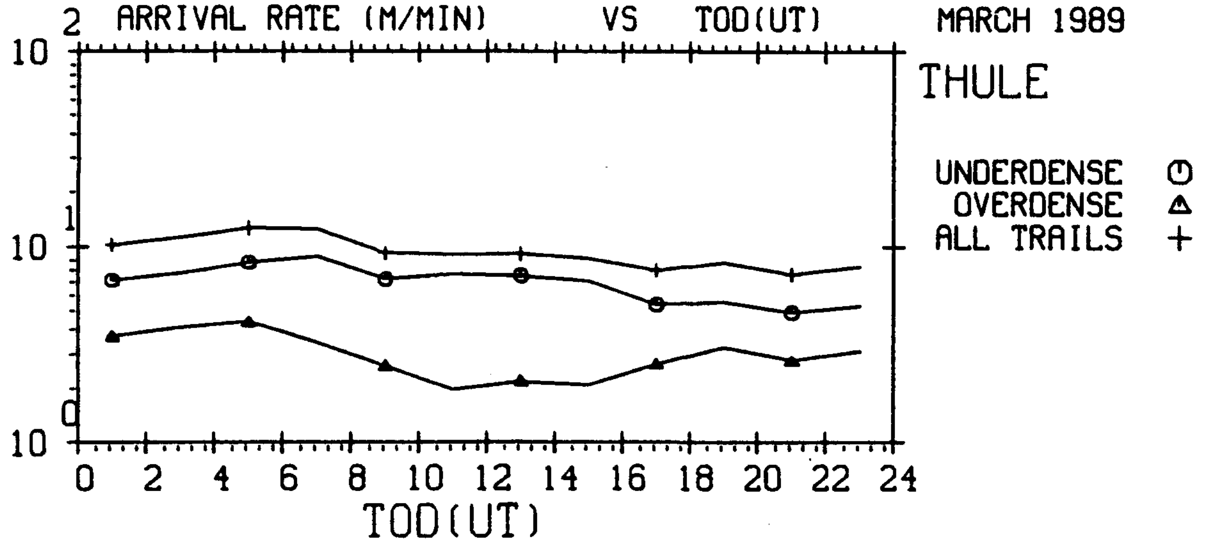



PLOT 123

# APPENDIX B

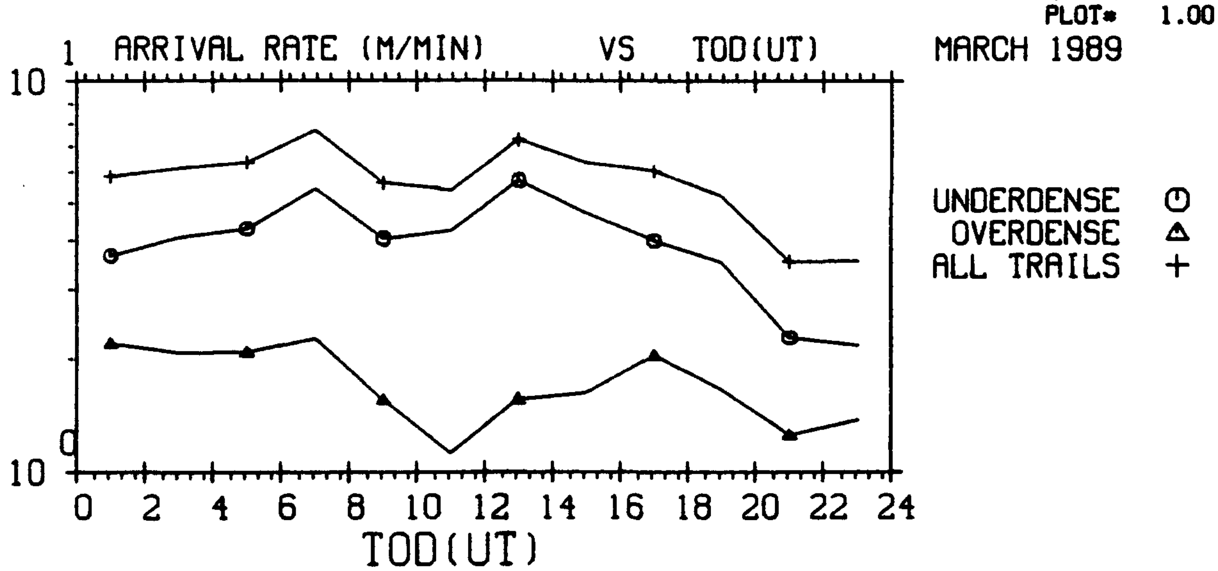
## STATISTICS FOR MARCH 1989

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

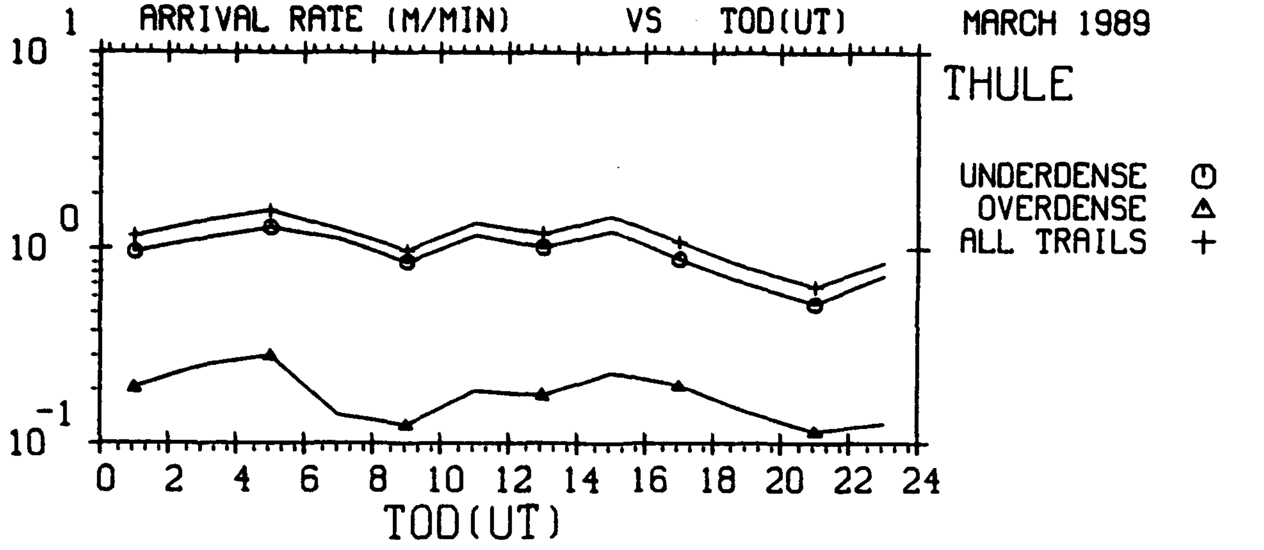
MENU=101,05-2
24-SEP-90
PLOT= 1.00




EXCEEDING -126.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

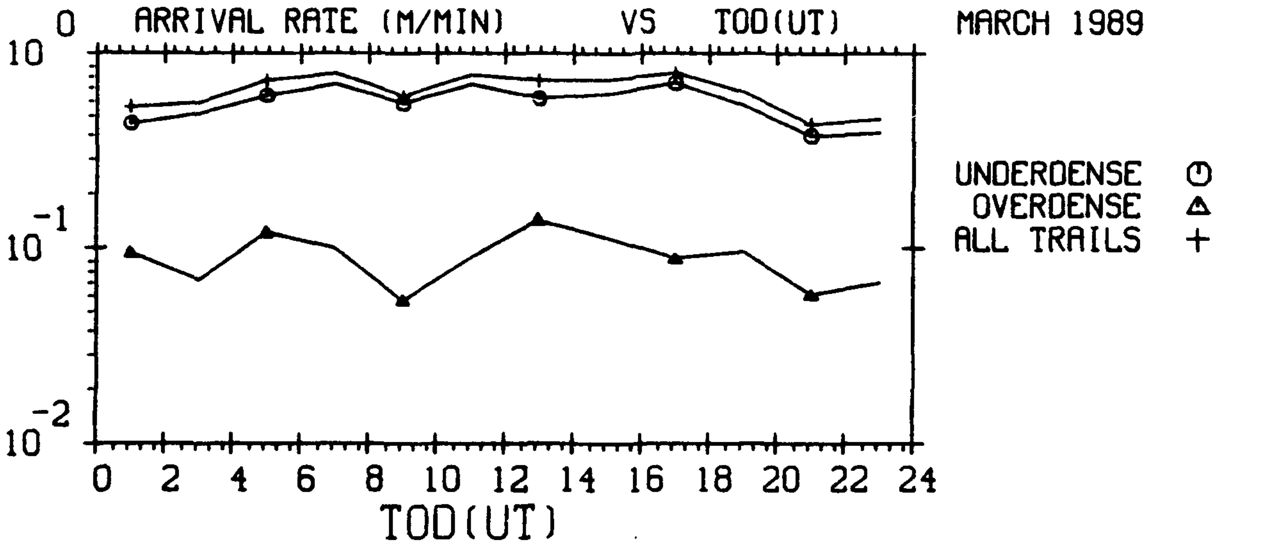
MENU=101,05-2
24-SEP-90
PLOT= 2.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

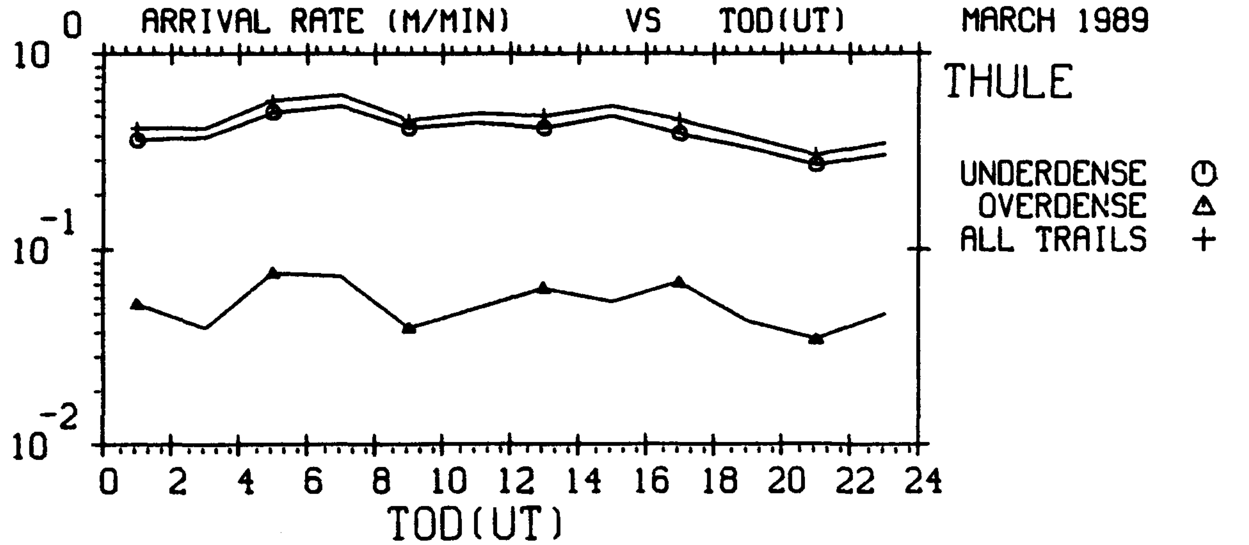
MENU=101,05-2
24-SEP-90
PLOT= 3.00




EXCEEDING -126.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

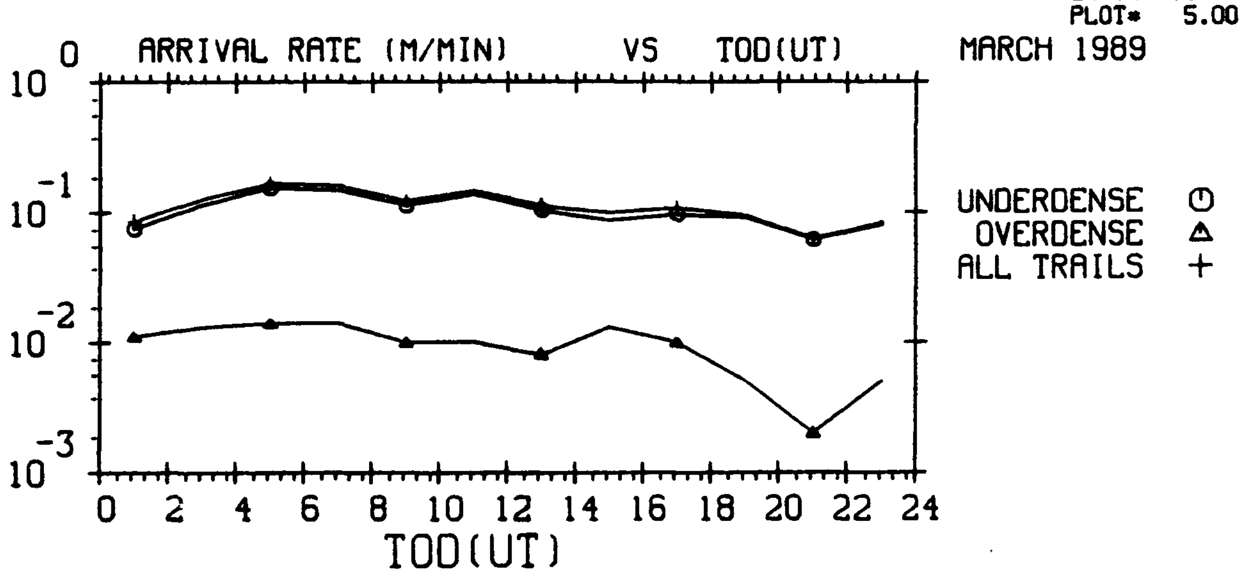
MENU=101,05-2
24-SEP-90
PLOT= 4.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

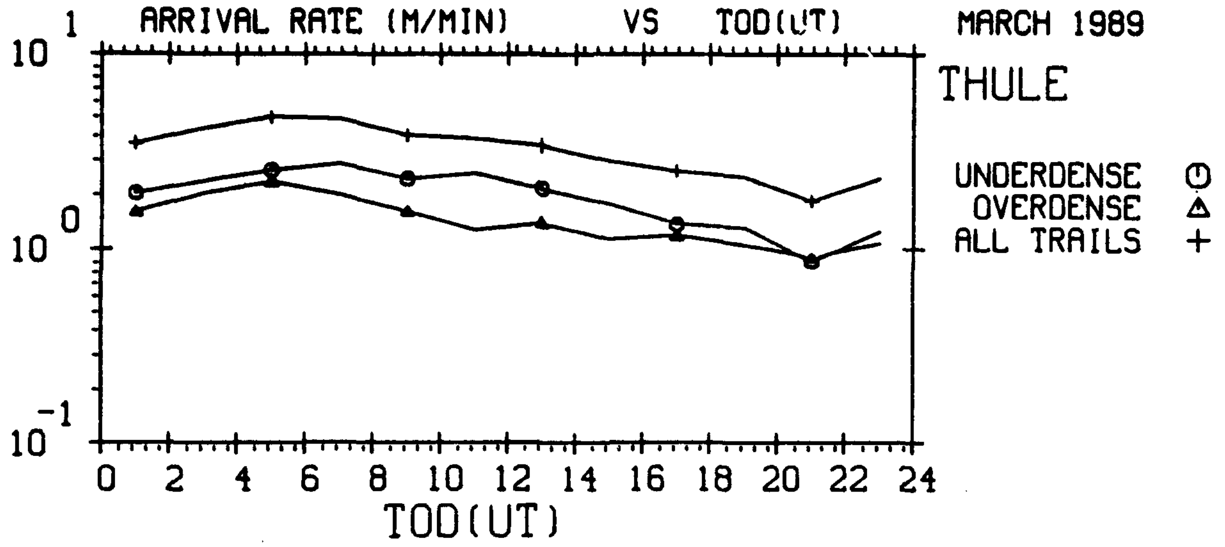
MENU=101,05-2
24-SEP-90
PLOT= 5.00




EXCEEDING -126.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

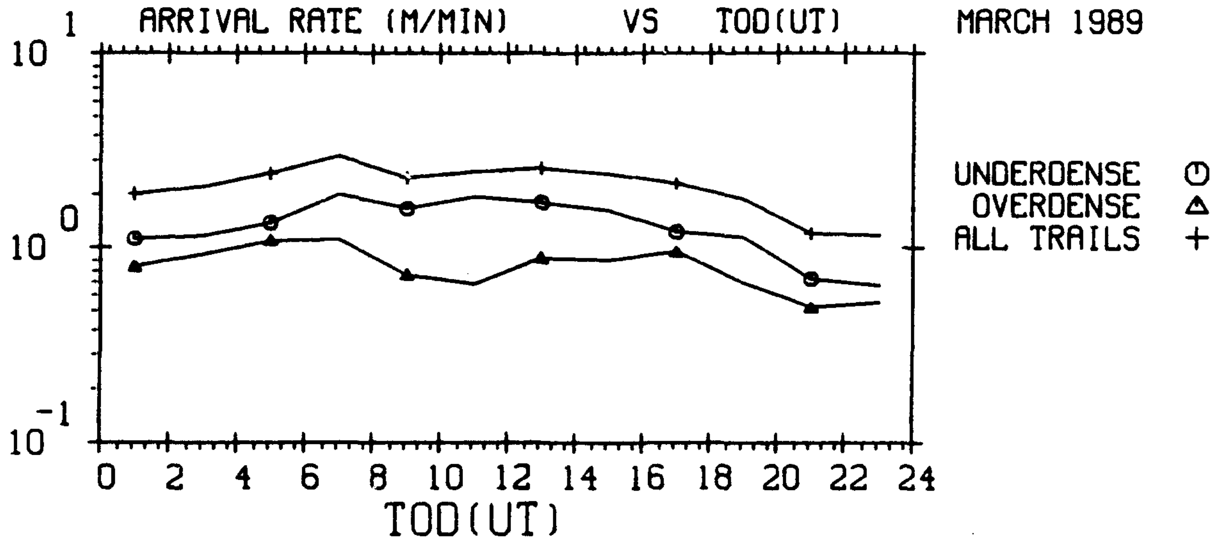
MENU=101,05-2
24-SEP-90
PLOT= 6.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

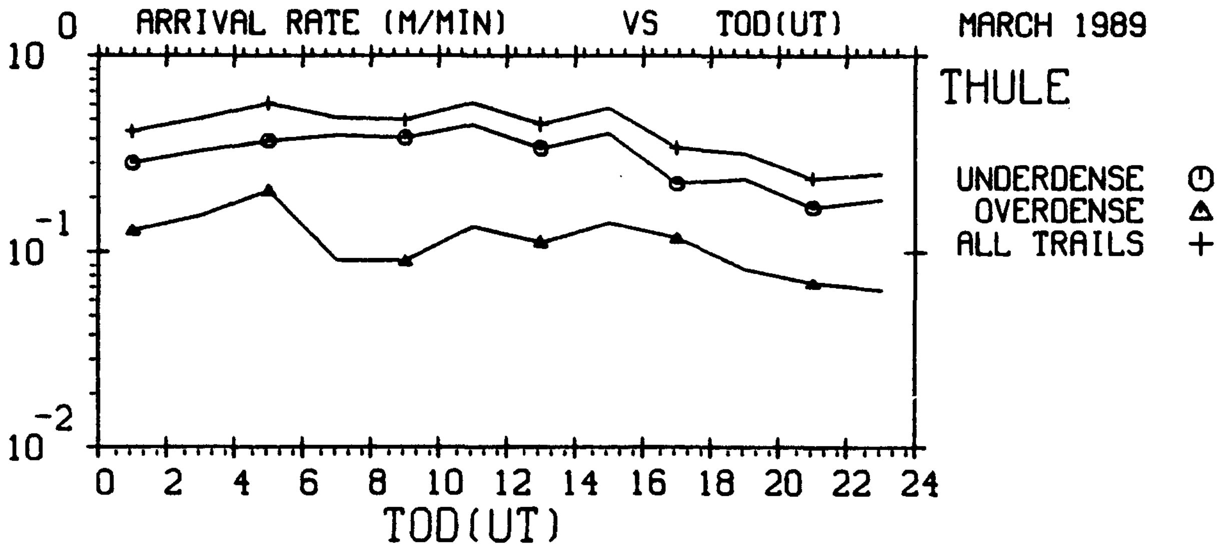
MENU=101,05-2
24-SEP-90
PLOT= 7.00




EXCEEDING -116.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

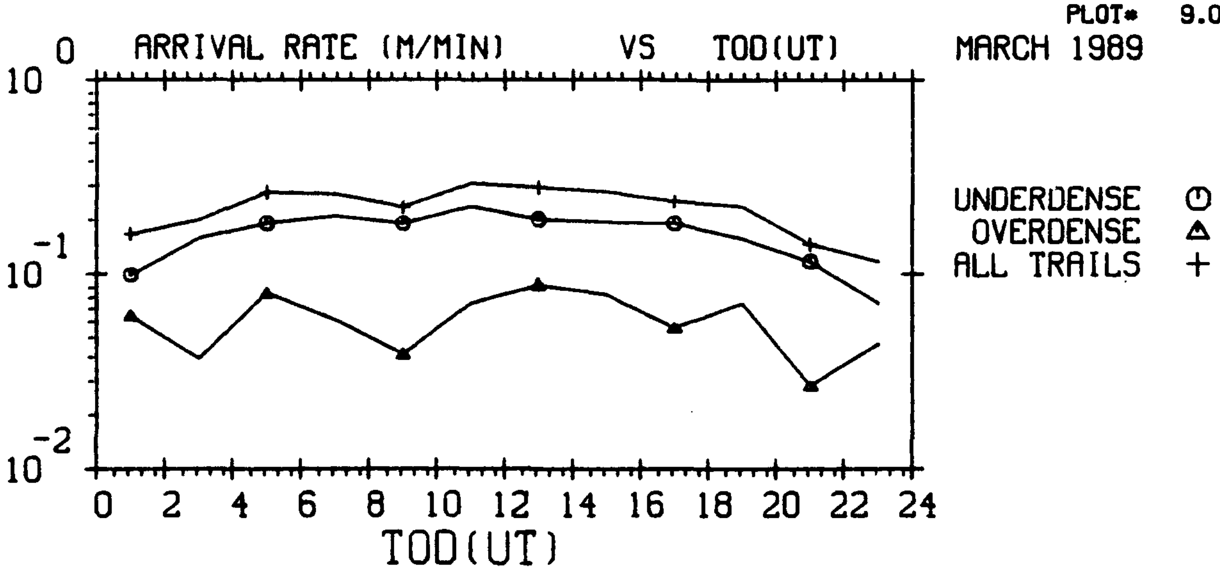
MENU=101,05-2
24-SEP-90
PLOT= 8.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

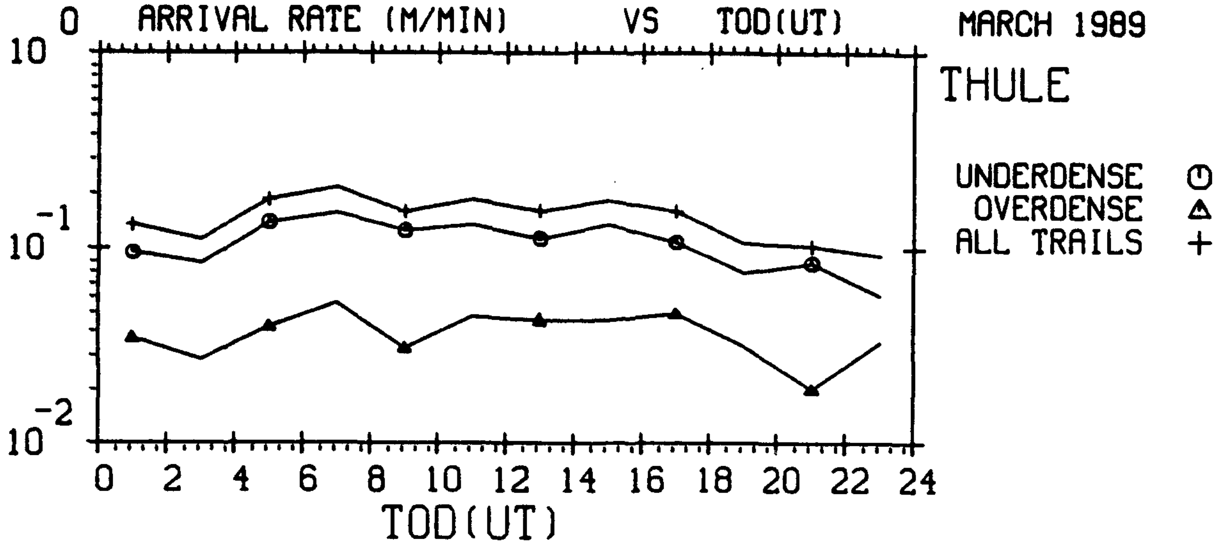
MENU=101,05-2
24-SEP-90
PLOT= 9.00




EXCEEDING -116.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

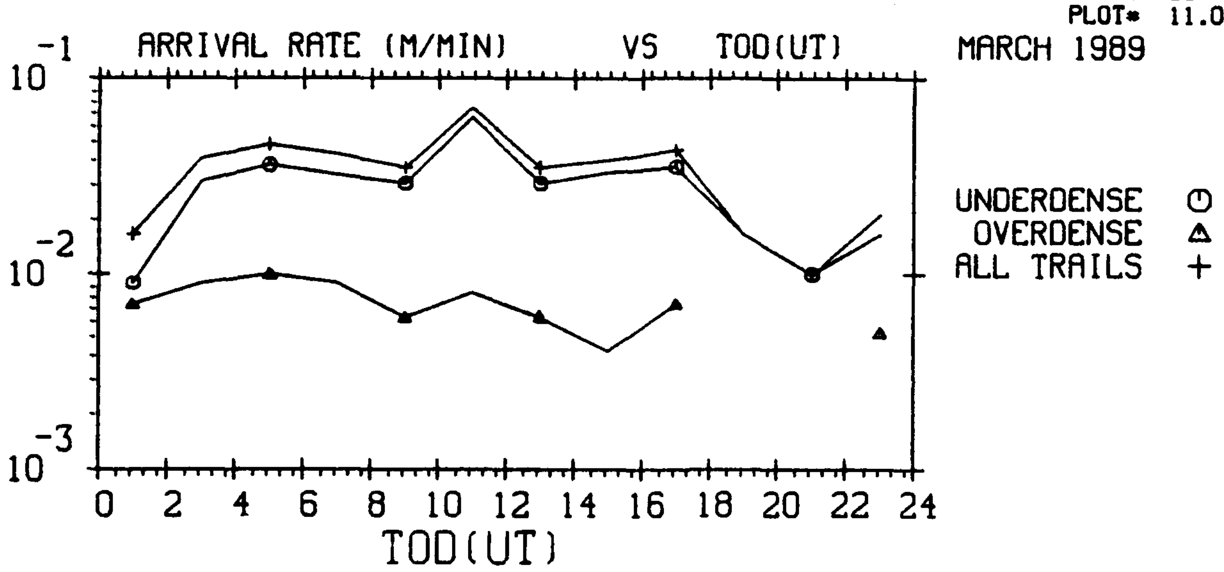
MENU=101,05-2
24-SEP-90
PLOT= 10.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

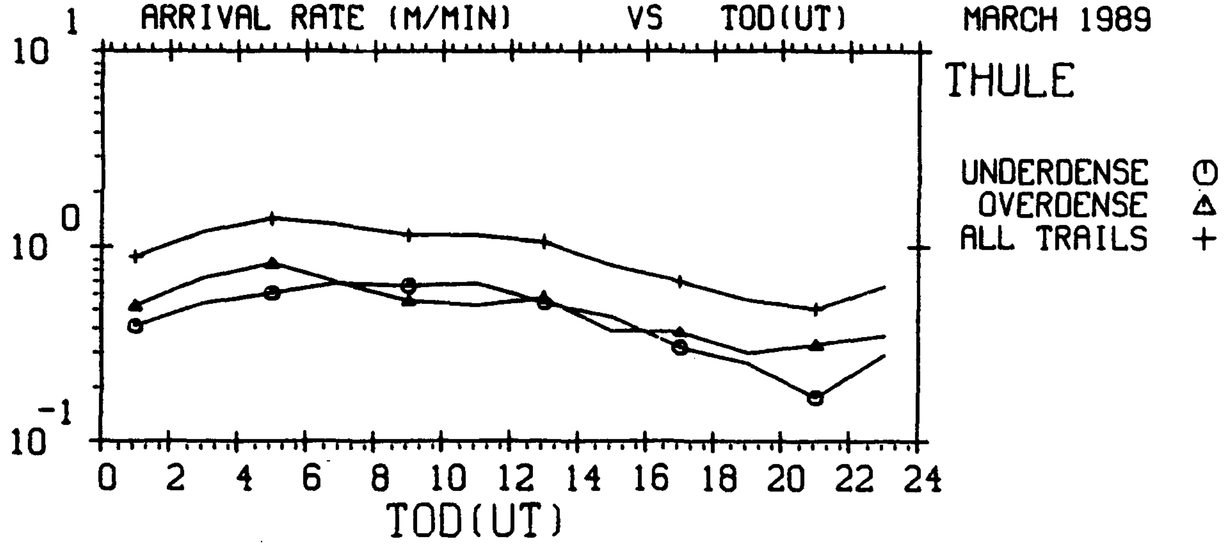
MENU*101,05-2
24-SEP-90
PLOT* 11.00




EXCEEDING -116.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

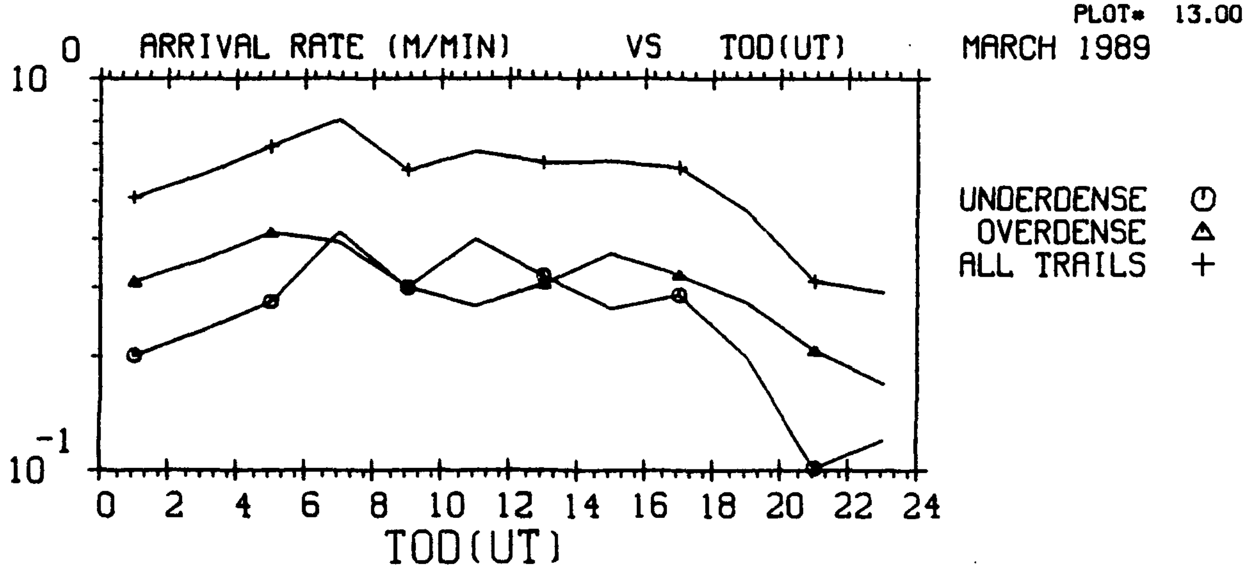
MENU*101,05-2
24-SEP-90
PLOT* 12.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

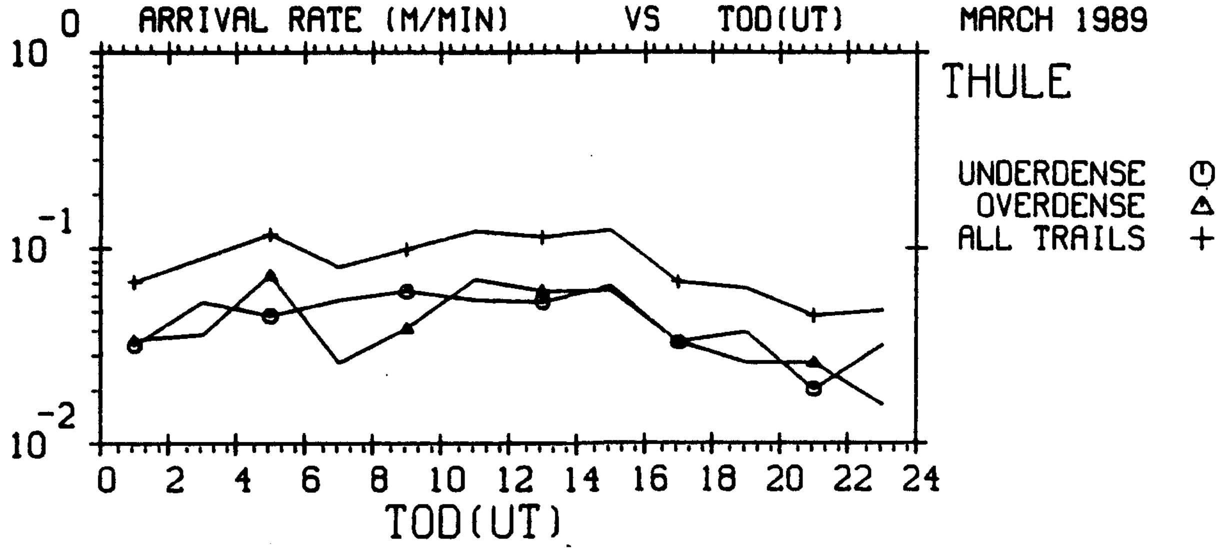
MENU=101,05-2
24-SEP-90
PLOT= 13.00




EXCEEDING -106.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

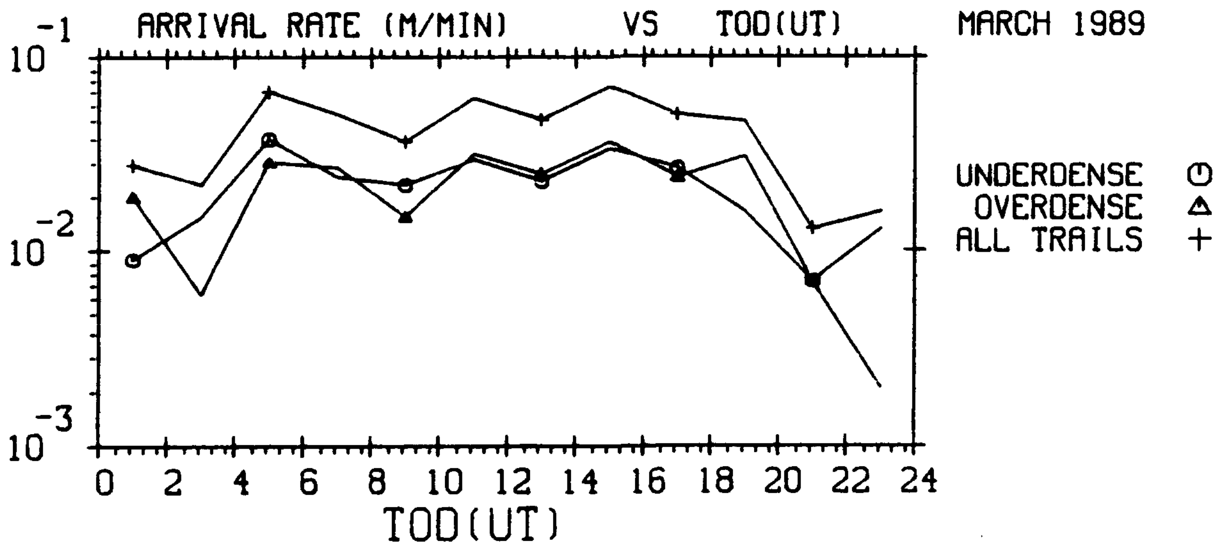
MENU=101,05-2
24-SEP-90
PLOT= 14.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

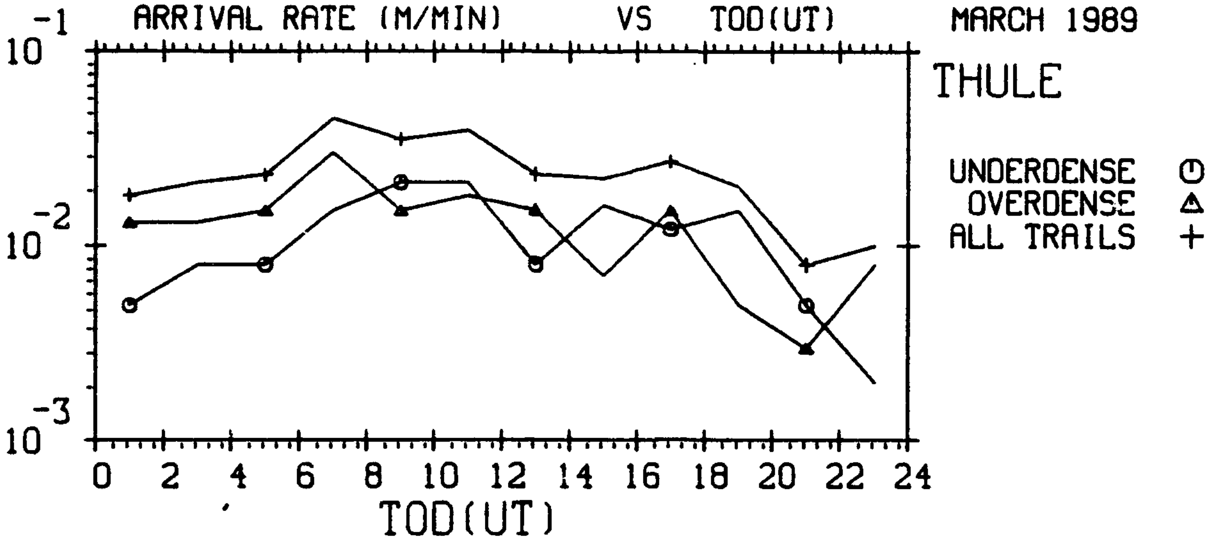
MENU=101,05-2
24-SEP-90
PLOT= 15.00




EXCEEDING -106.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

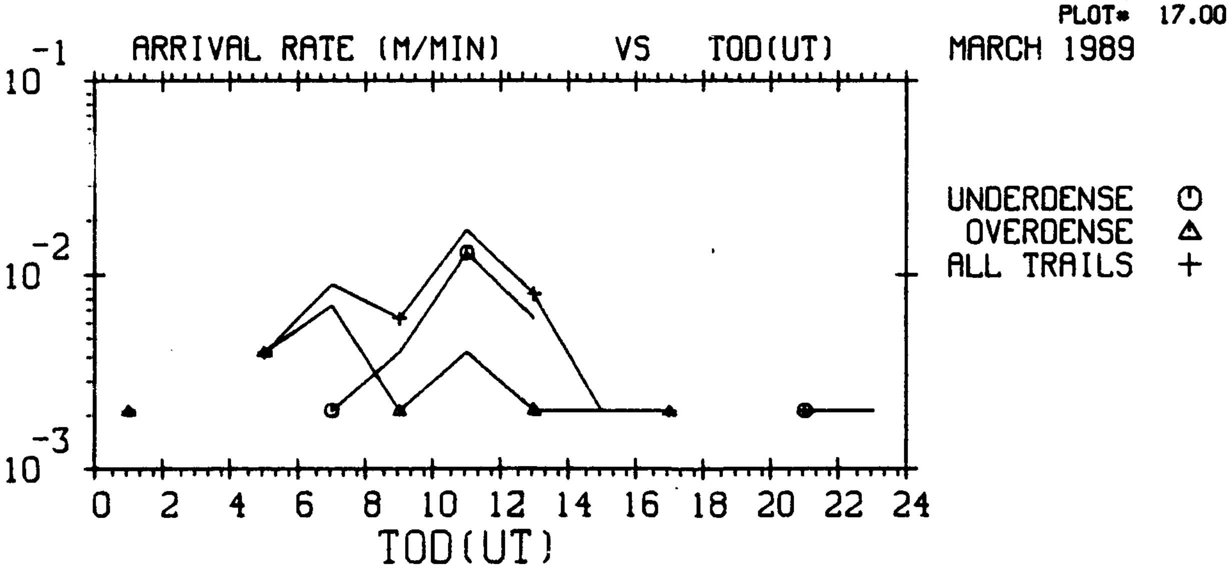
MENU=101,05-2
24-SEP-90
PLOT= 16.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

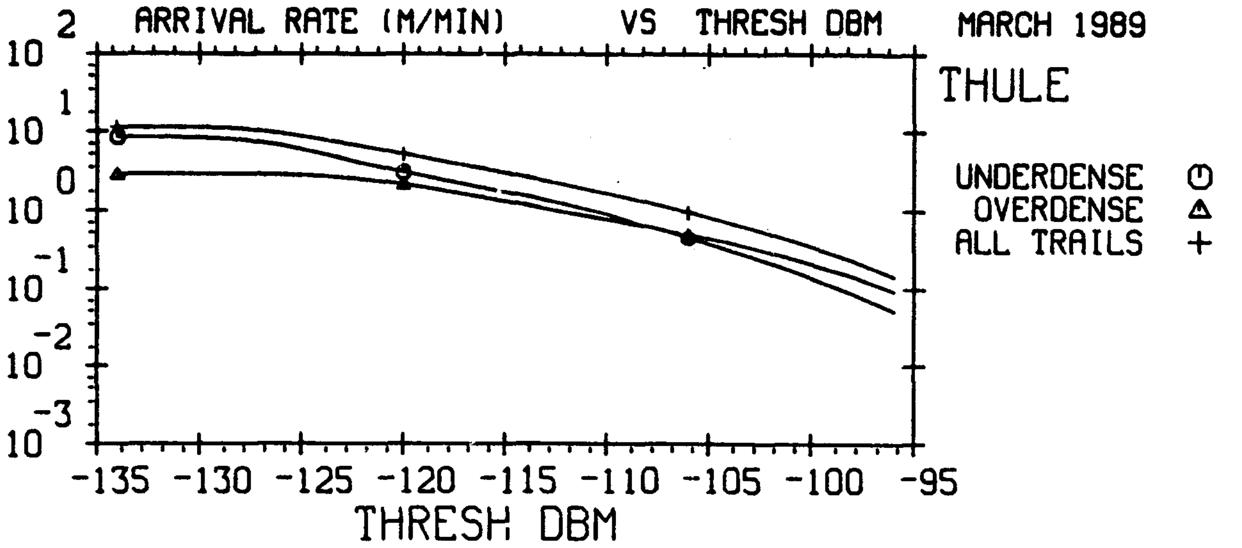
MENU=101,05-2
24-SEP-90
PLOT= 17.00




EXCEEDING -106.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

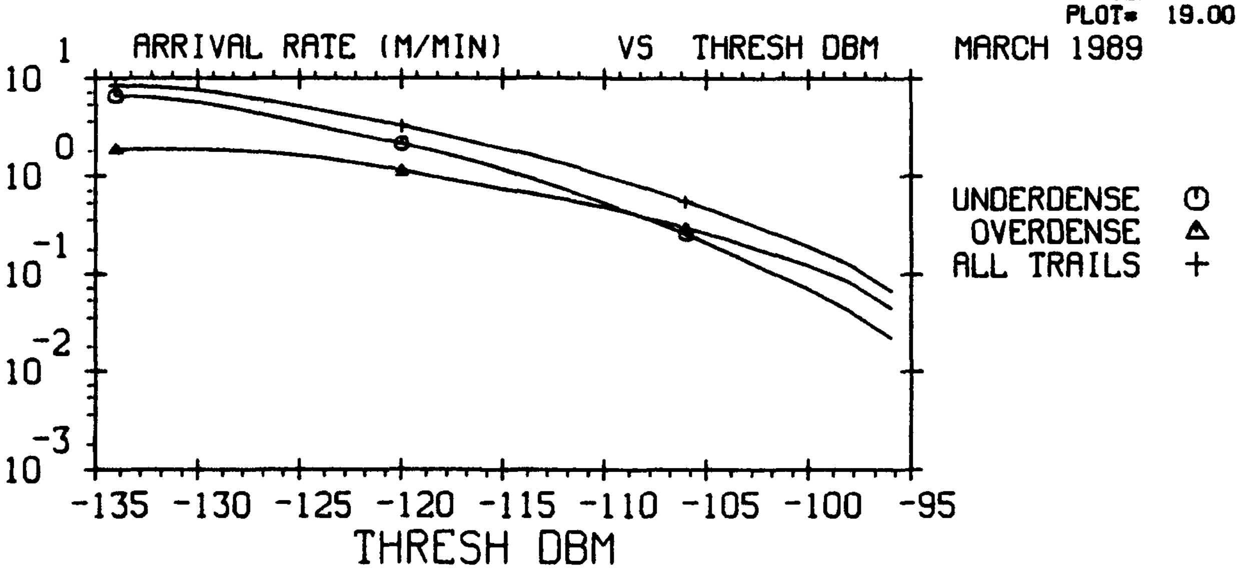
MENU=101,05-2
24-SEP-90
PLOT= 18.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

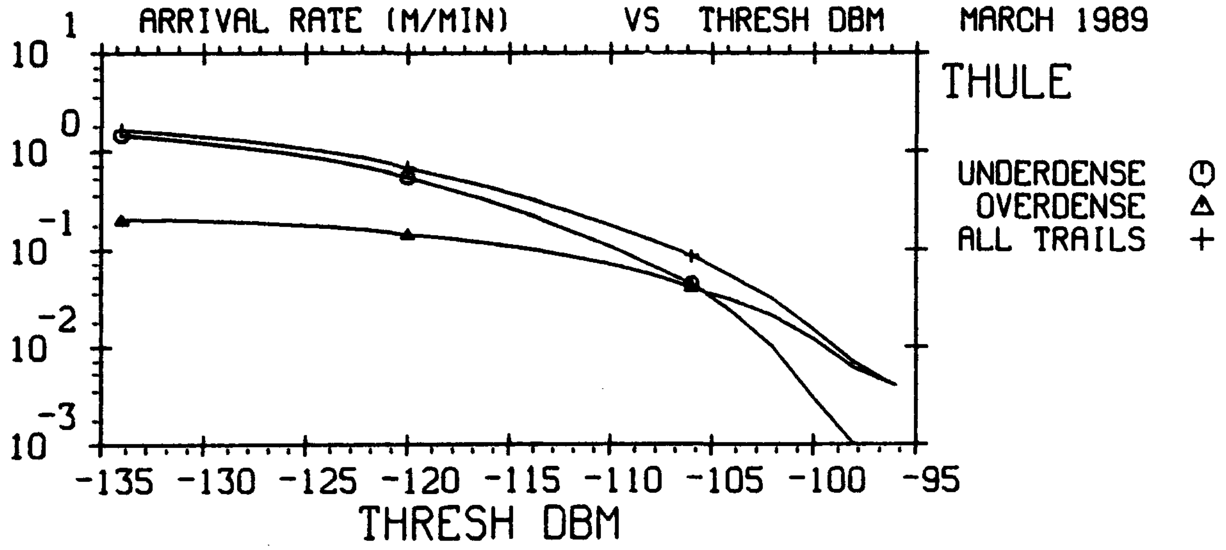
MENU=101,06-2
24-SEP-90
PLOT= 19.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

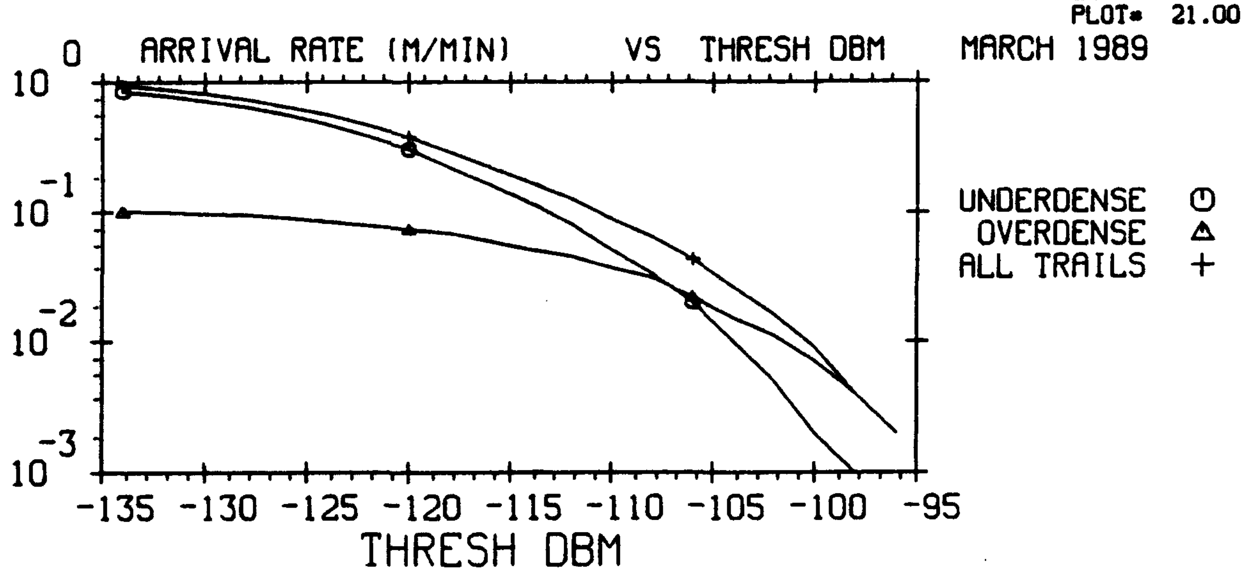
MENU=101,06-2
24-SEP-90
PLOT= 20.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

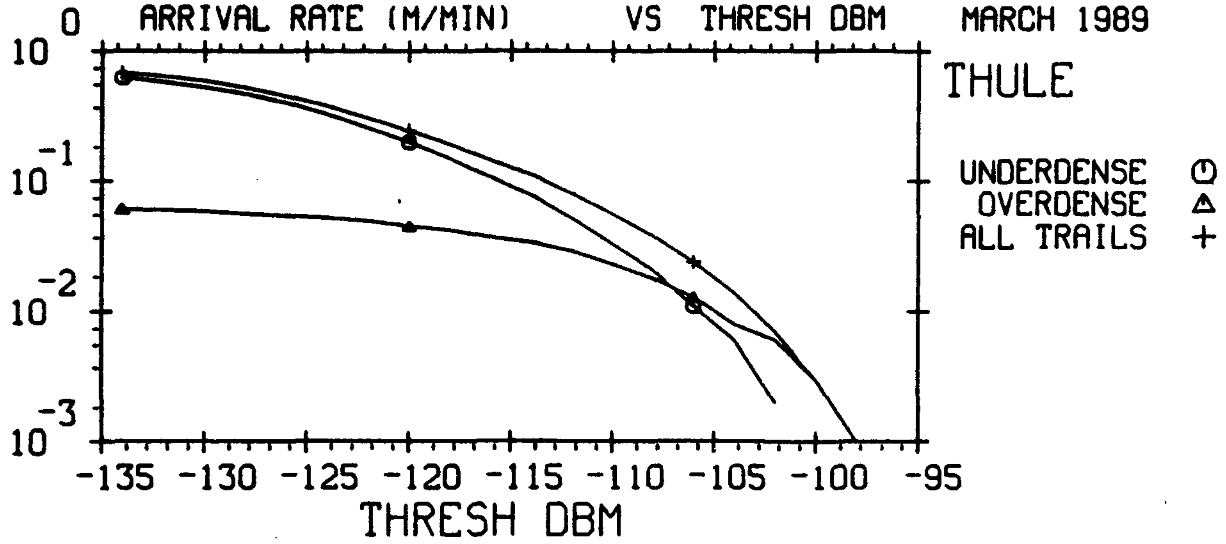
MENU=101,06-2
24-SEP-90
PLOT= 21.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

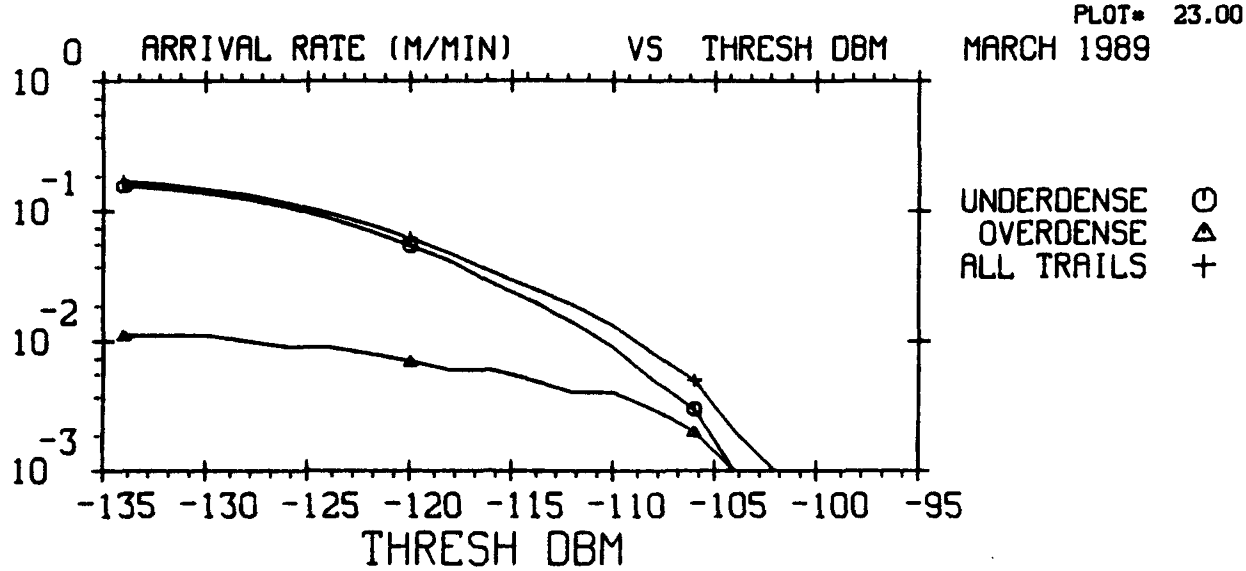
MENU=101,06-2
24-SEP-90
PLOT= 22.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

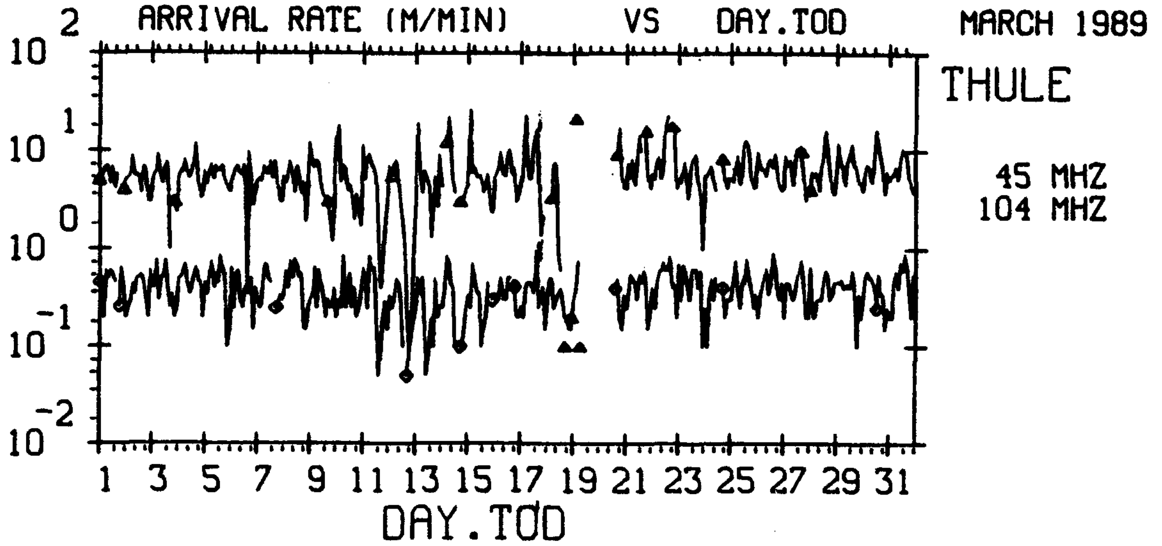
MENU=101,06-2
24-SEP-90
PLOT= 23.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

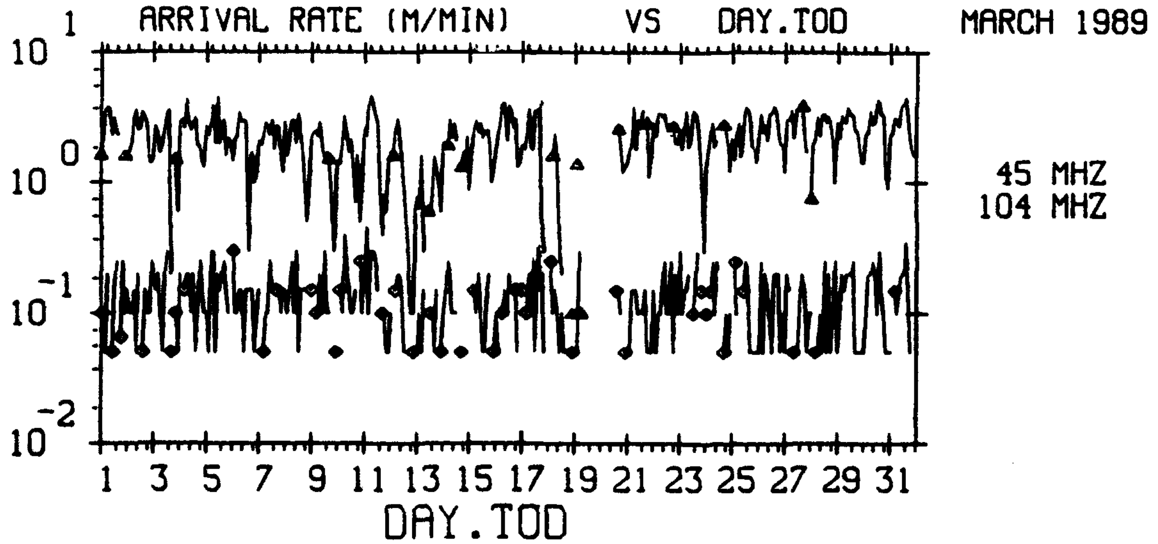
MENU=101,06-2
24-SEP-90
PLOT= 24.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

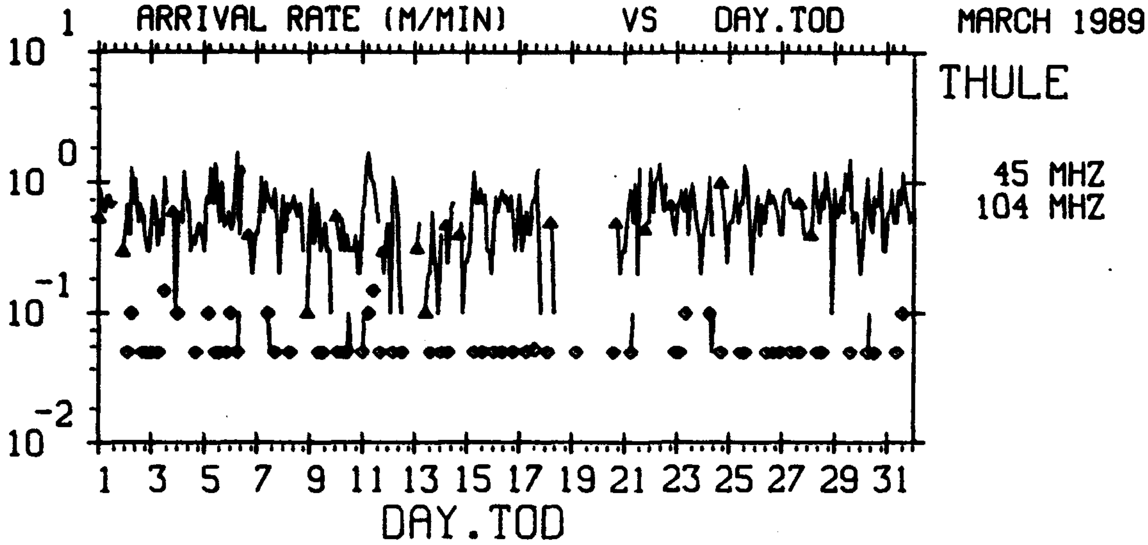
MENU=101,03-2
24-SEP-90
PLOT= 25.00




EXCEEDING -116.0 DBM RSL
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

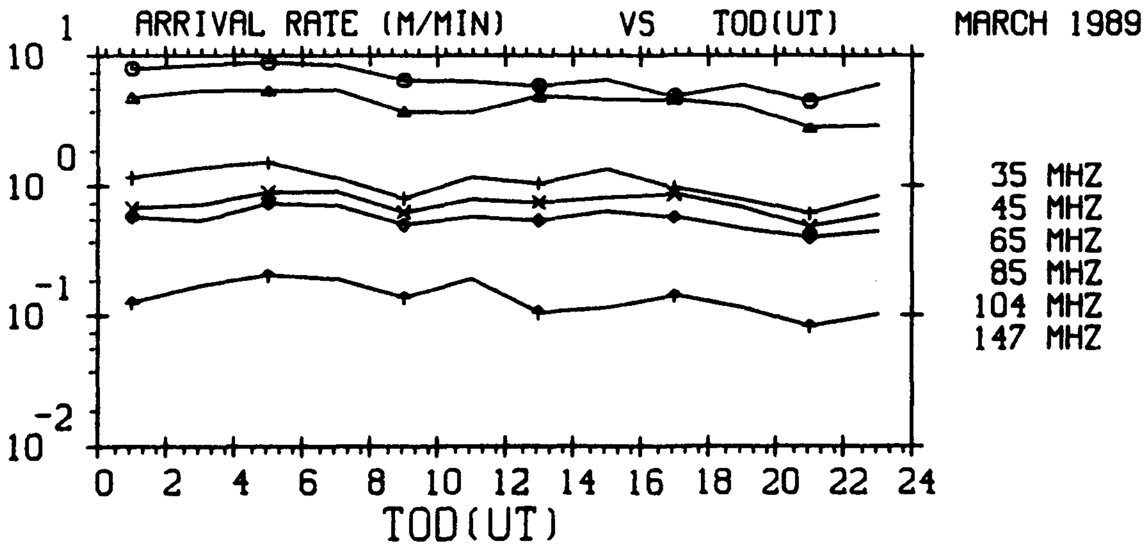
MENU=101,03-2
24-SEP-90
PLOT= 26.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

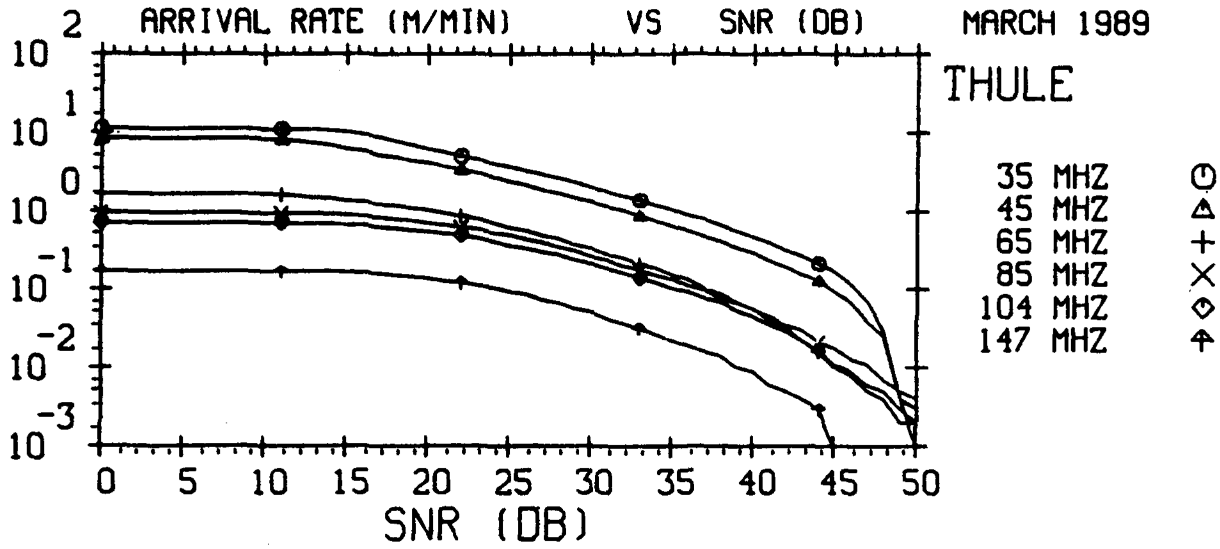
MENU=101,03-2
24-SEP-90
PLOT= 27.00




EXCEEDING 19.0 DB SNR
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

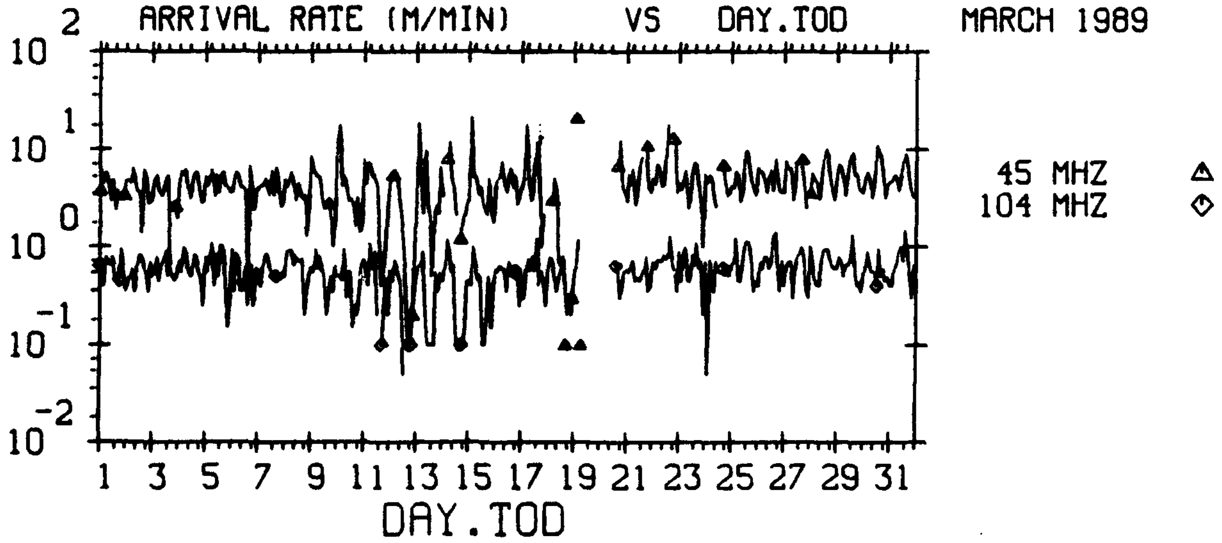
MENU=102,01-2
24-SEP-90
PLOT= 28.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

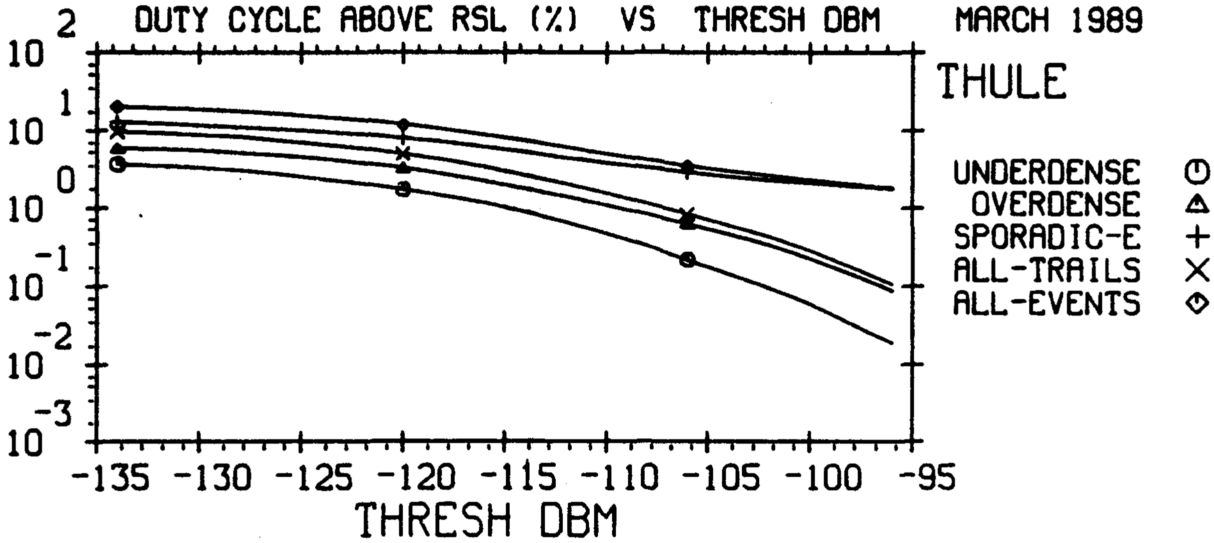
MENU*102,02-2
24-SEP-90
PLOT* 29.00




EXCEEDING 19.0 DB SNR
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

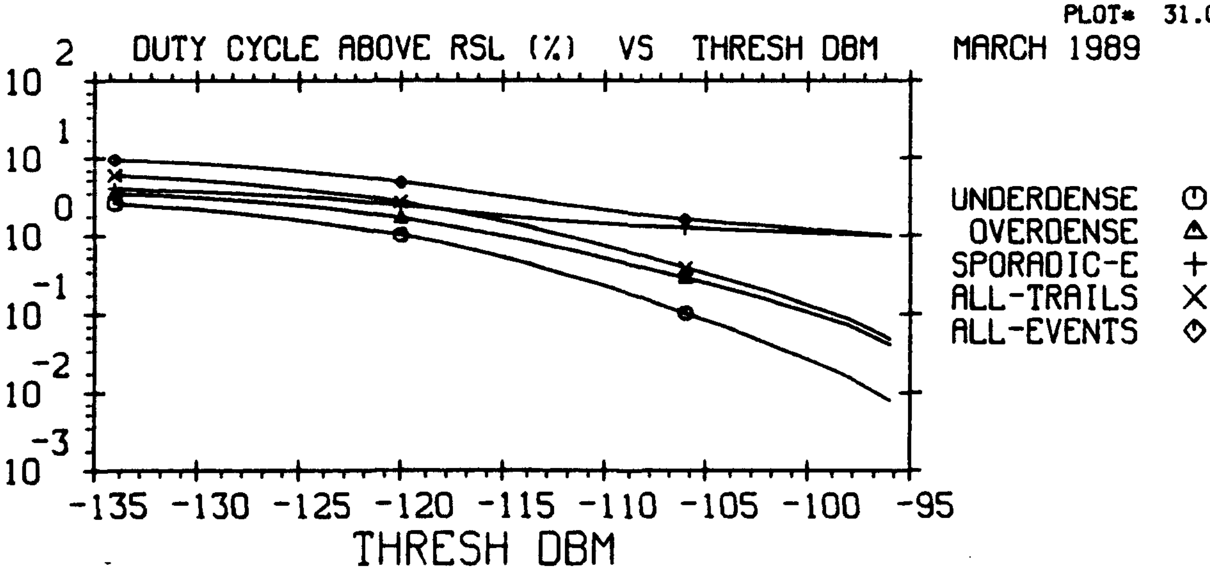
MENU*102,03-2
24-SEP-90
PLOT* 30.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

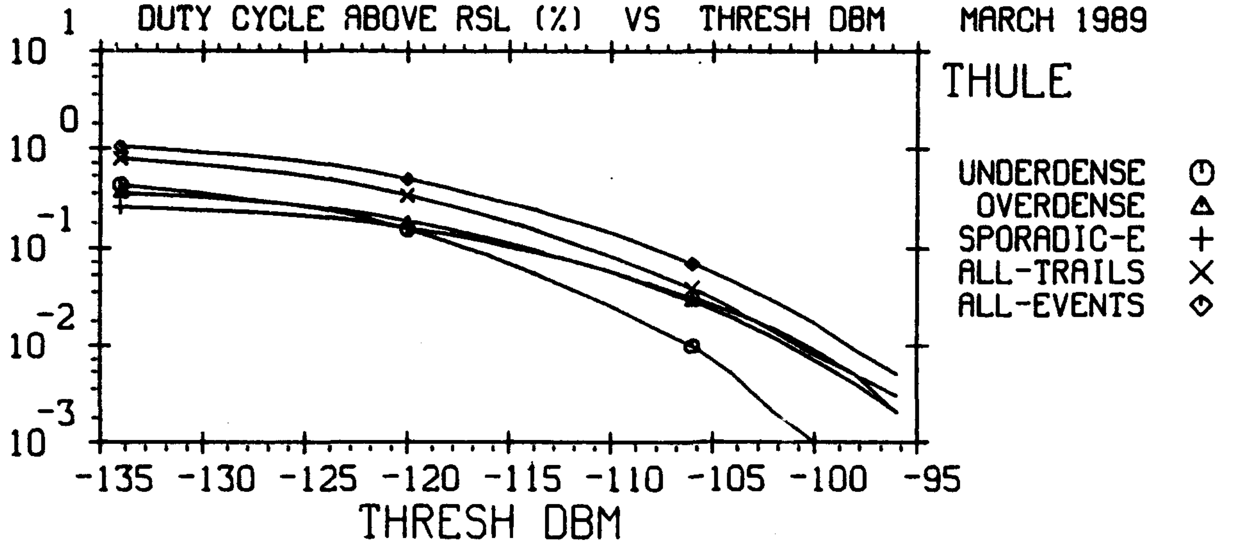
MENU=103,06-2
24-SEP-90
PLOT= 31.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

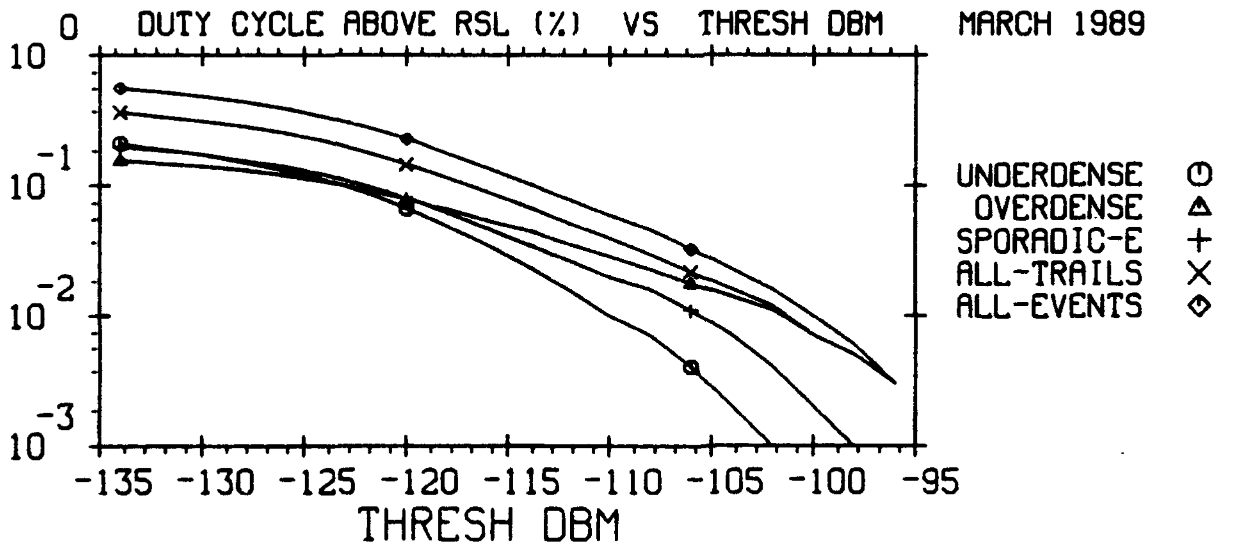
MENU=103,06-2
24-SEP-90
PLOT= 32.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM



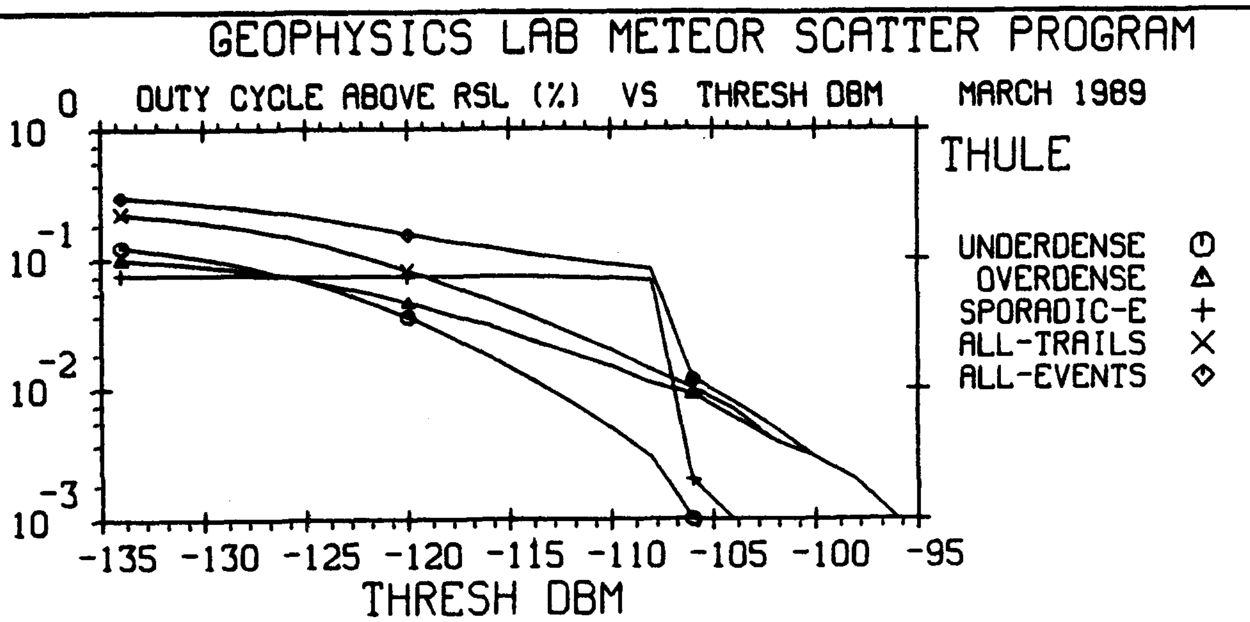

THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

MENU=103,06-2
24-SEP-90
PLOT= 33.00



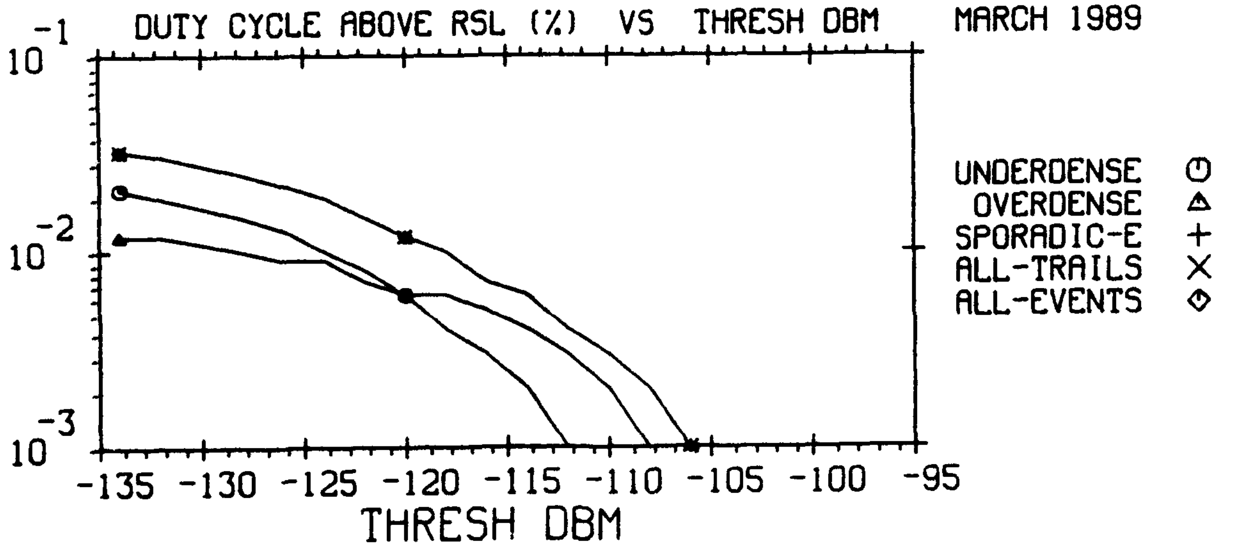

THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

MENU=103,06-2
24-SEP-90
PLOT= 34.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

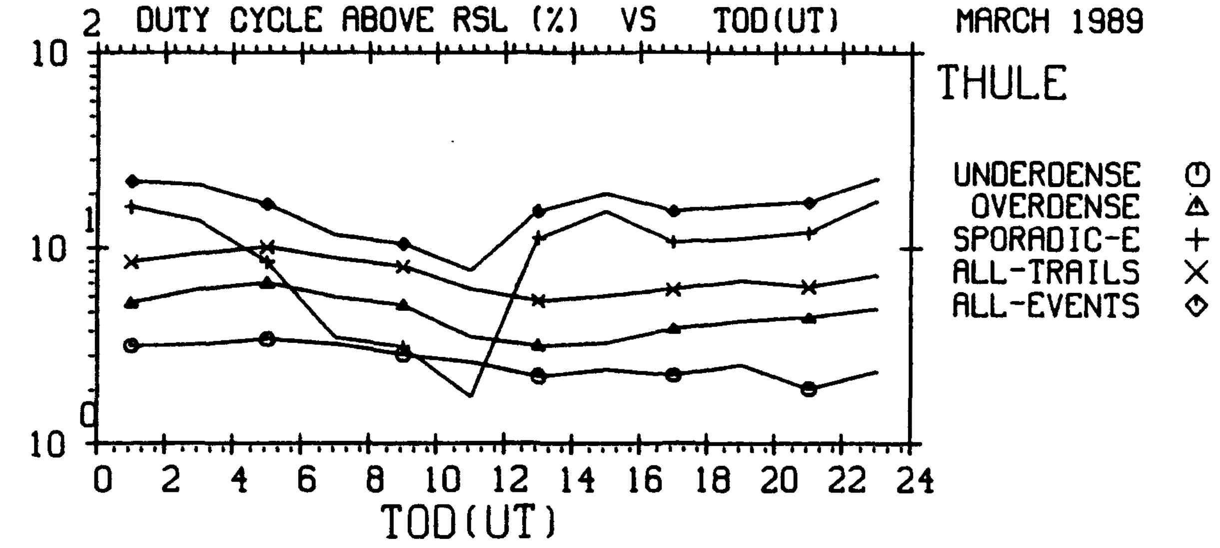
MENU=103,06-2
24-SEP-90
PLOT= 35.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

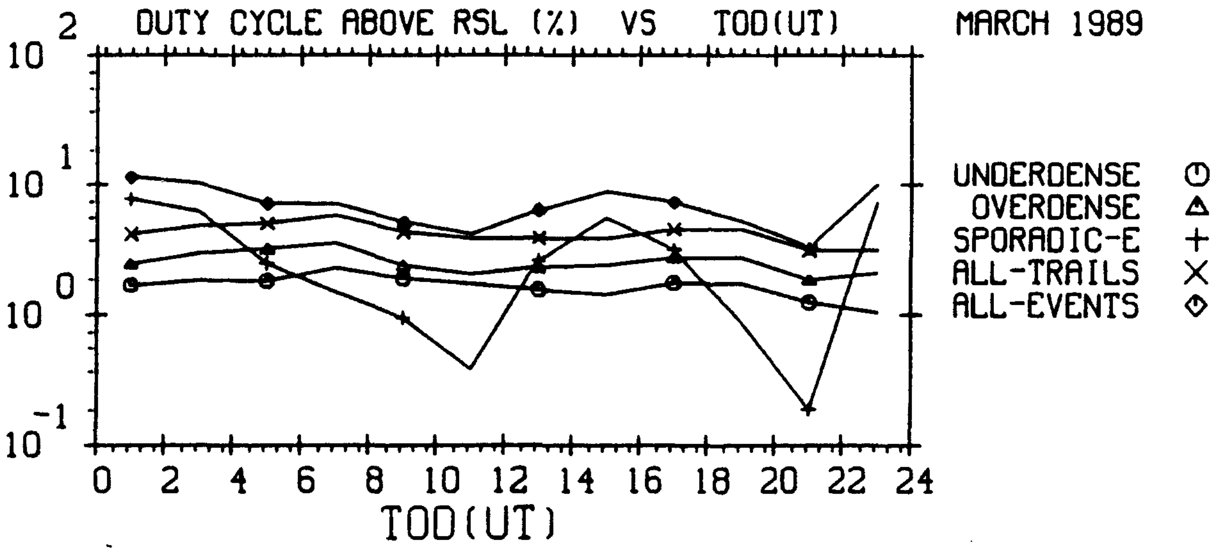
MENU=103,06-2
24-SEP-90
PLOT= 36.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

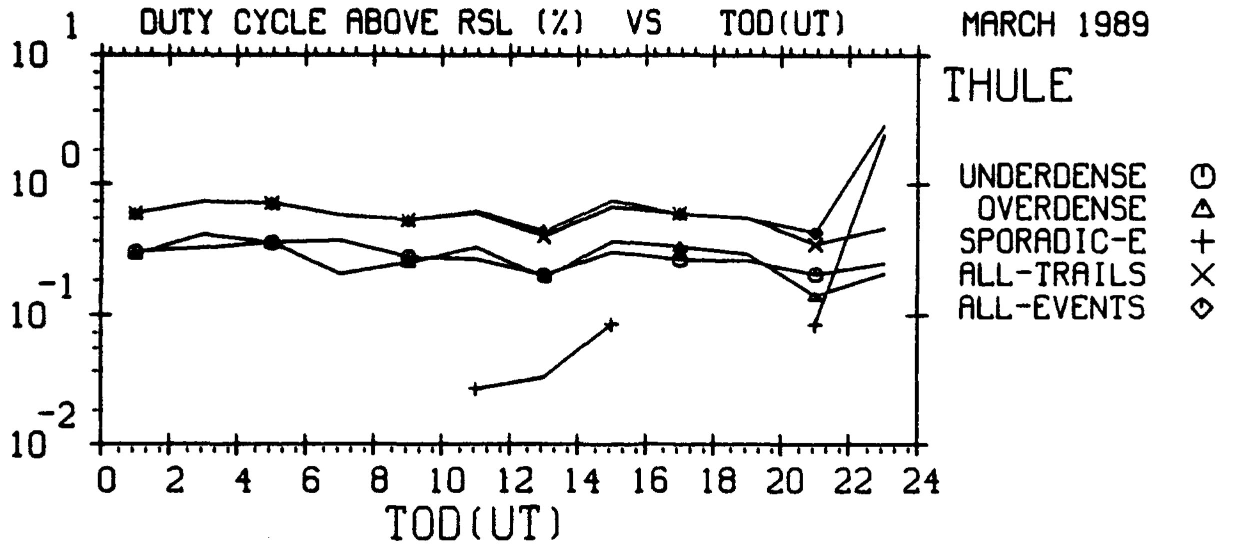
MENU=103,07-2
24-SEP-90
PLOT= 37.00




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

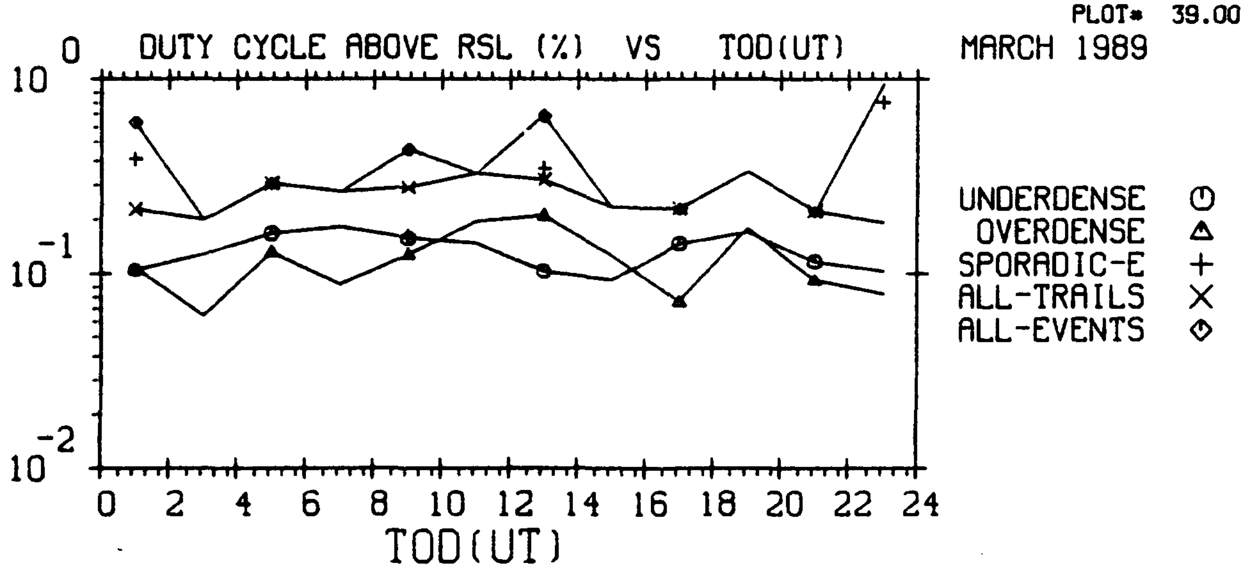
MENU=103,07-2
24-SEP-90
PLOT= 38.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

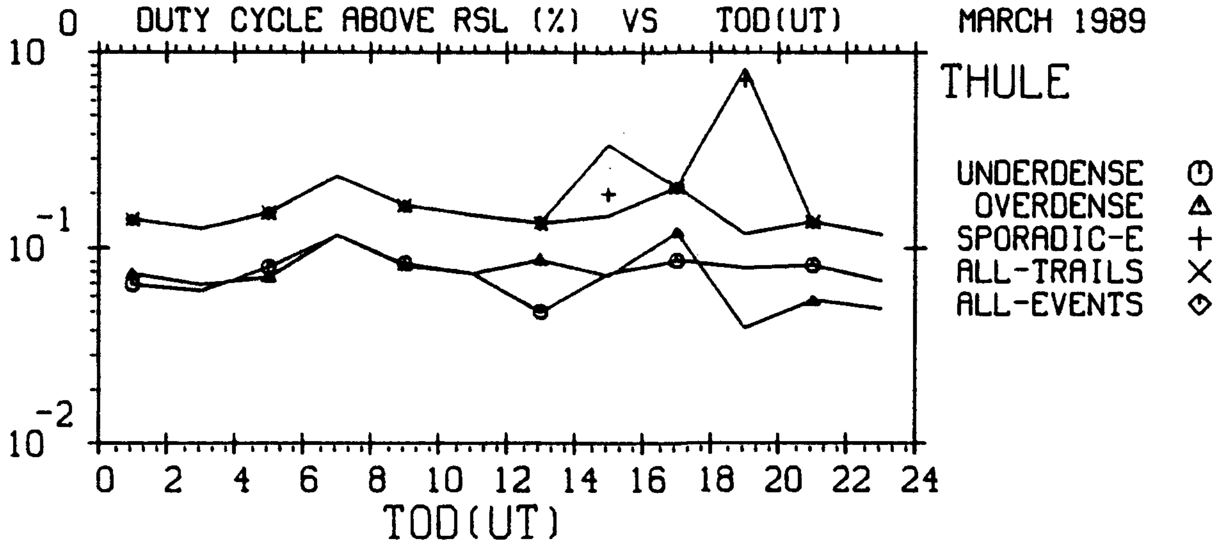
MENU*103,07-2
24-SEP-90
PLOT* 39.00




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

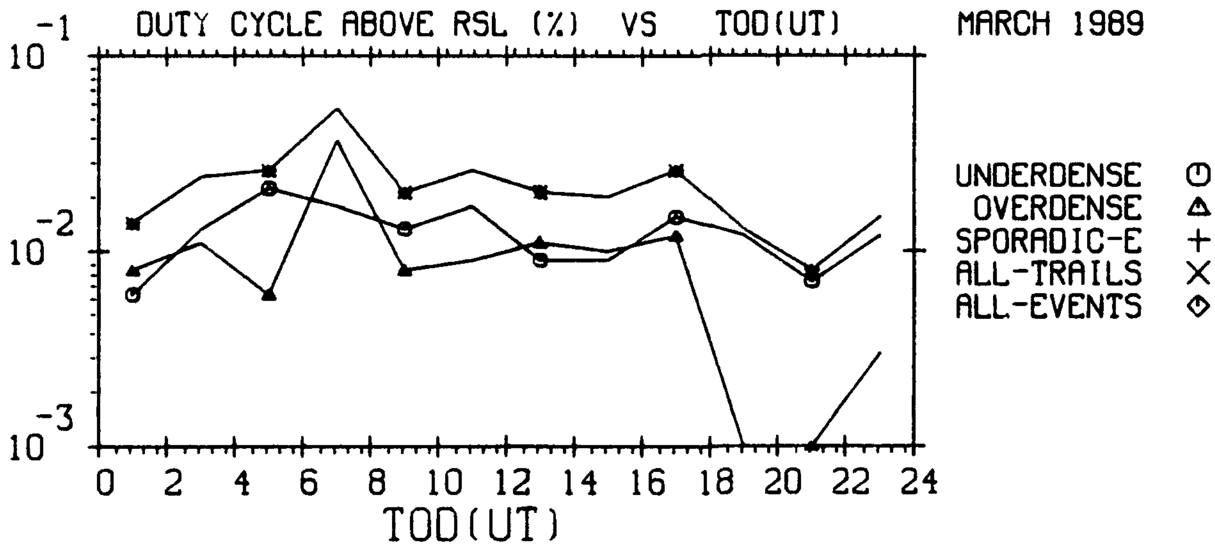
MENU*103,07-2
24-SEP-90
PLOT* 40.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

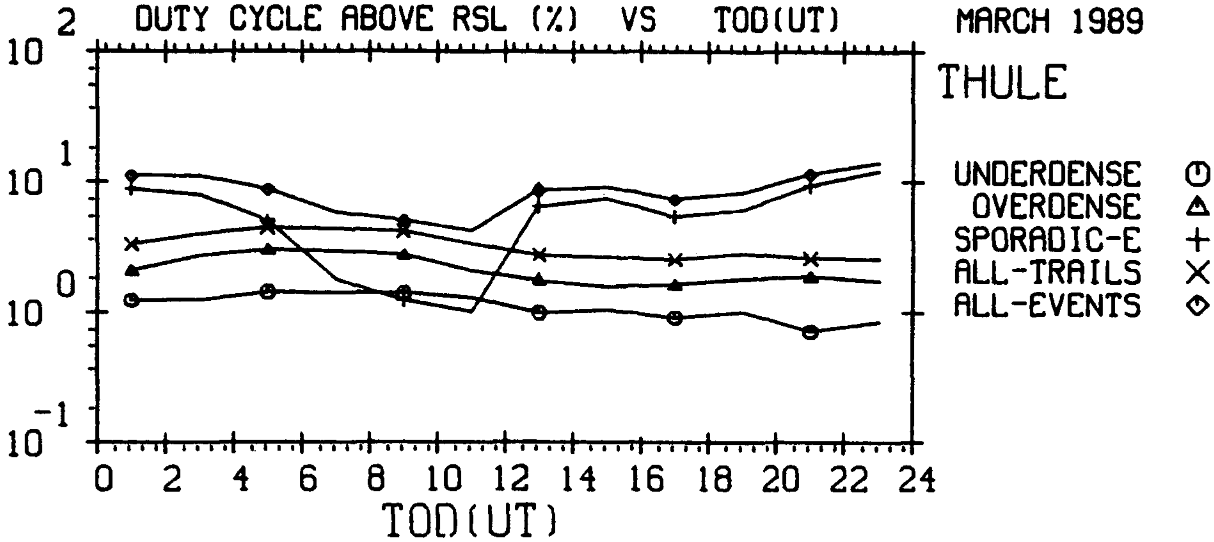
MENU=103,07-2
24-SEP-90
PLOT= 41.00




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

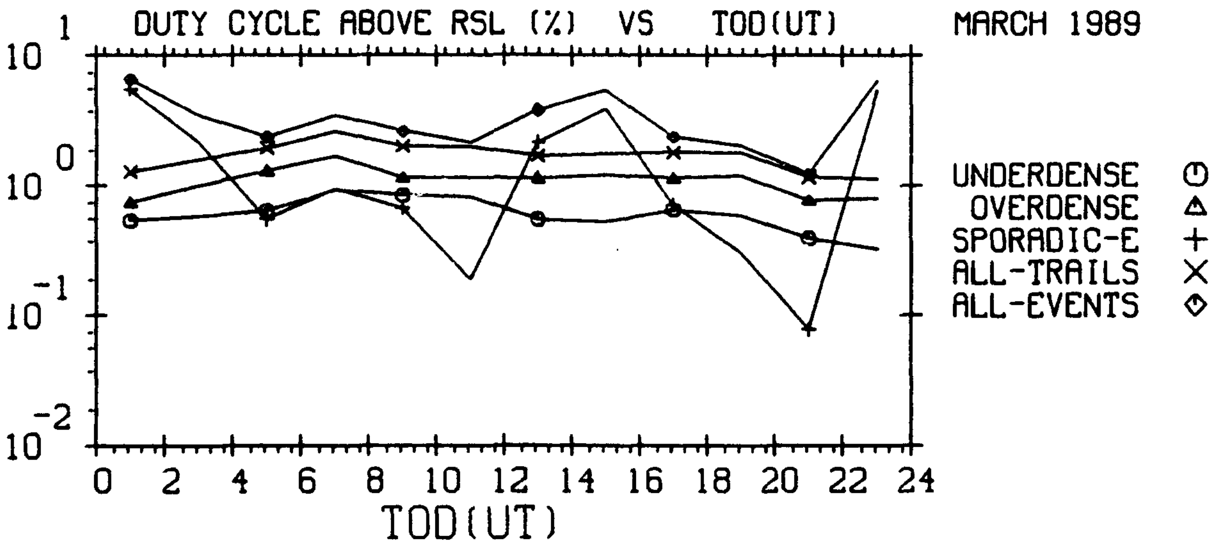
MENU=103,07-2
24-SEP-90
PLOT= 42.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

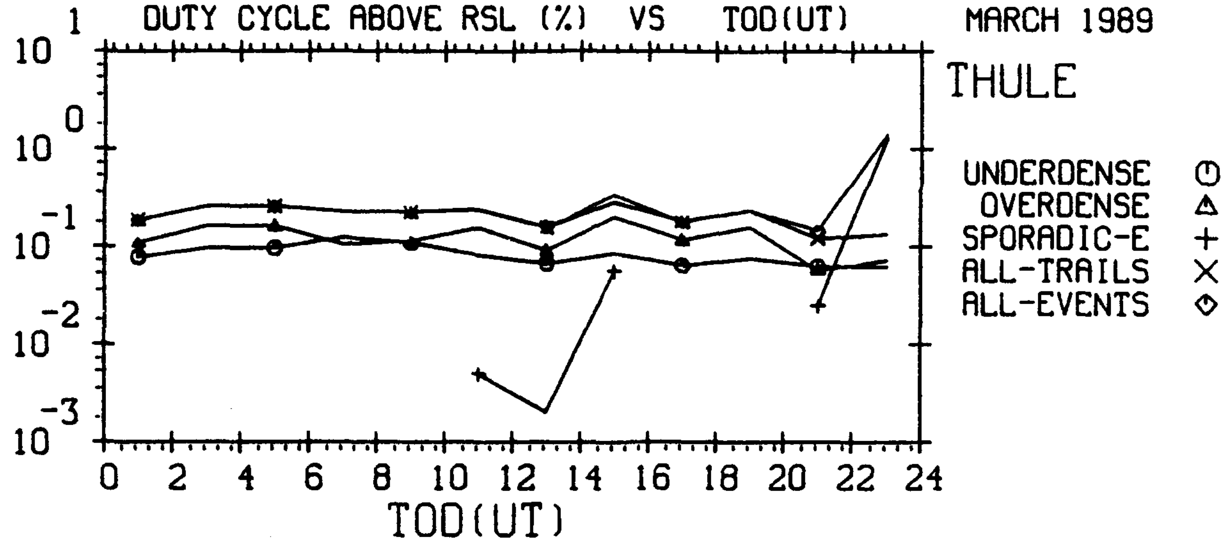
MENU=103,07-2
24-SEP-90
PLOT= 43.00




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

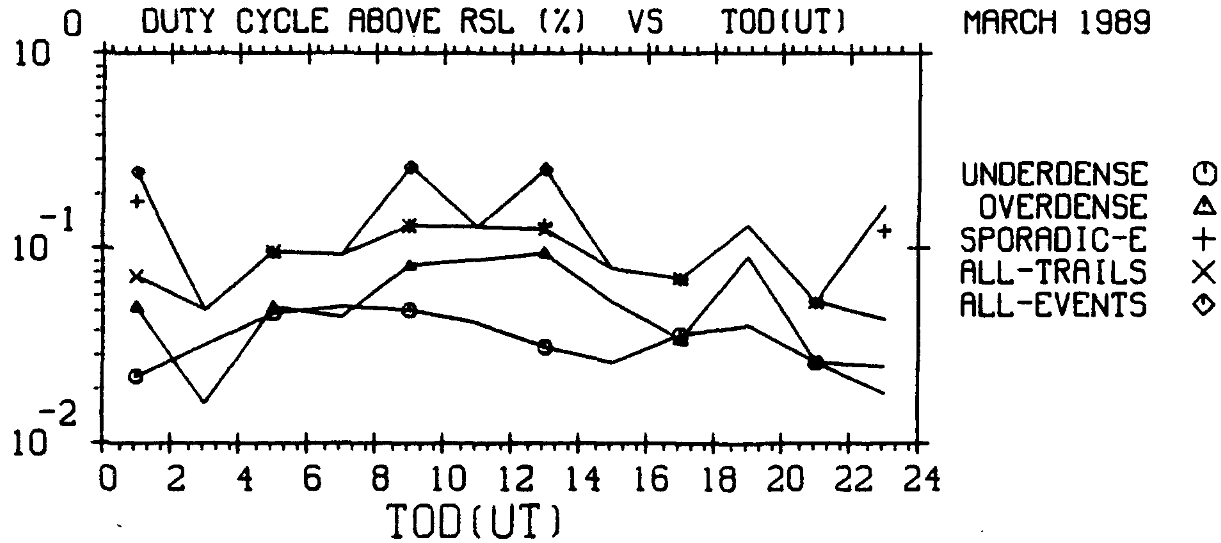
MENU=103,07-2
24-SEP-90
PLOT= 44.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

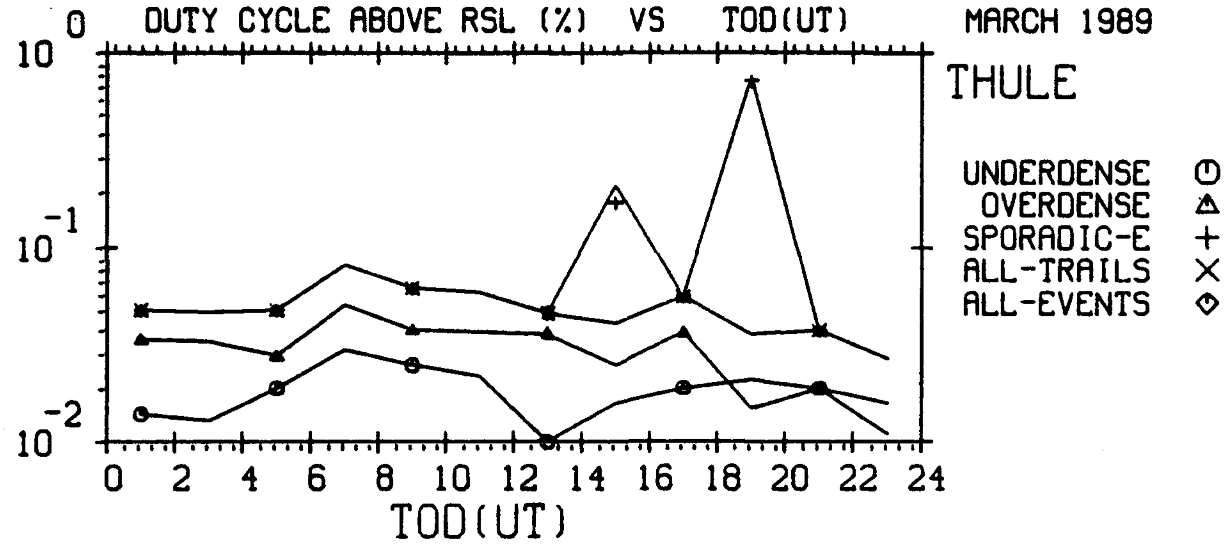
MENU=103,07-2
24-SEP-90
PLOT= 45.00




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

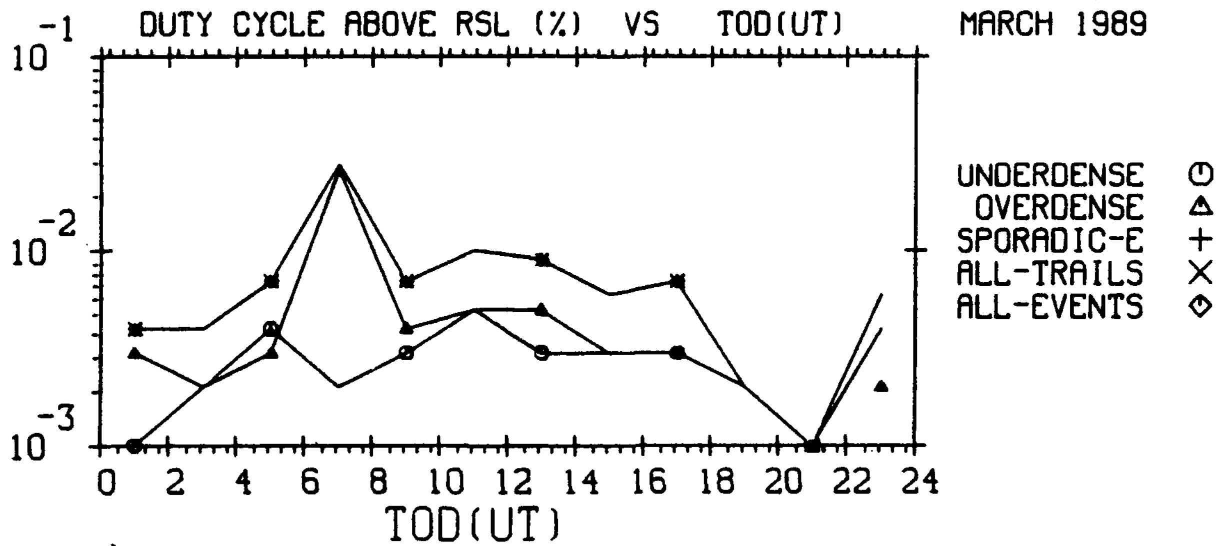
MENU=103,07-2
24-SEP-90
PLOT= 46.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

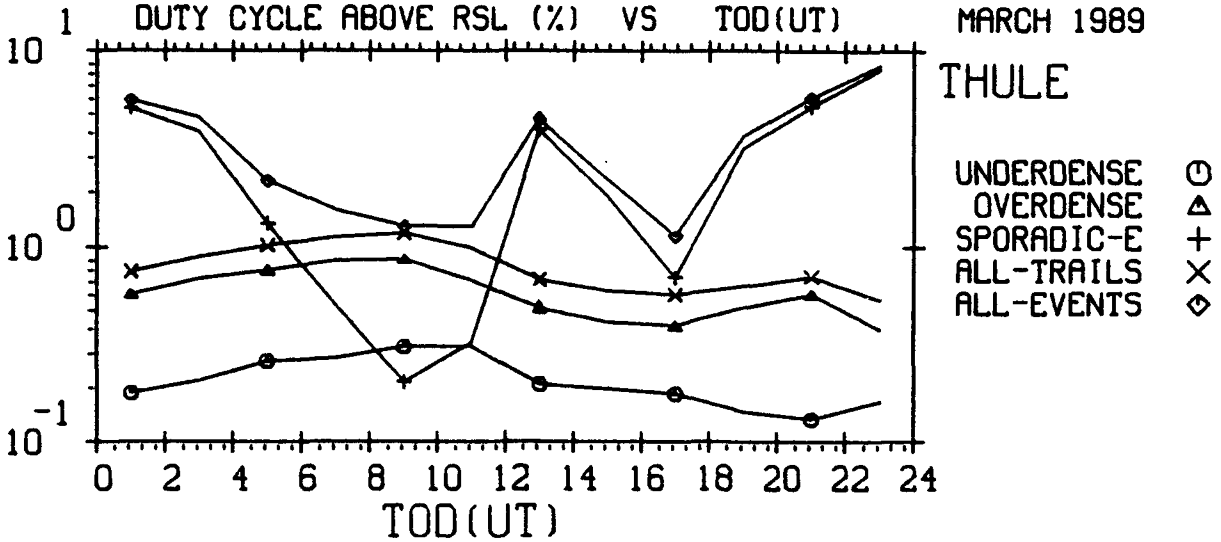
MENU=103,07-2
24-SEP-90
PLOT= 47.00




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

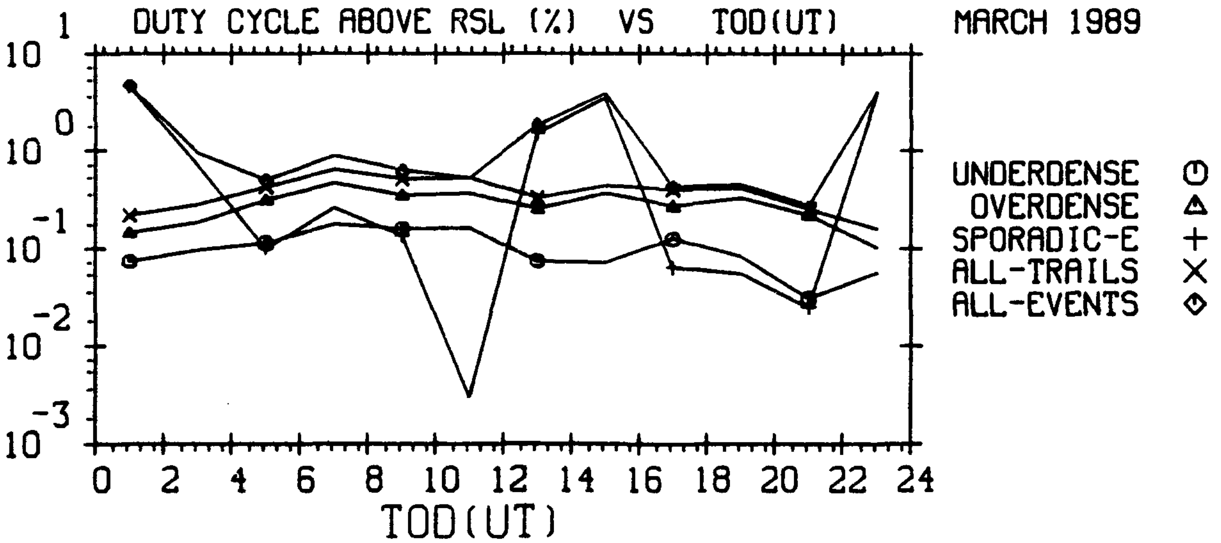
MENU=103,07-2
24-SEP-90
PLOT= 48.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM



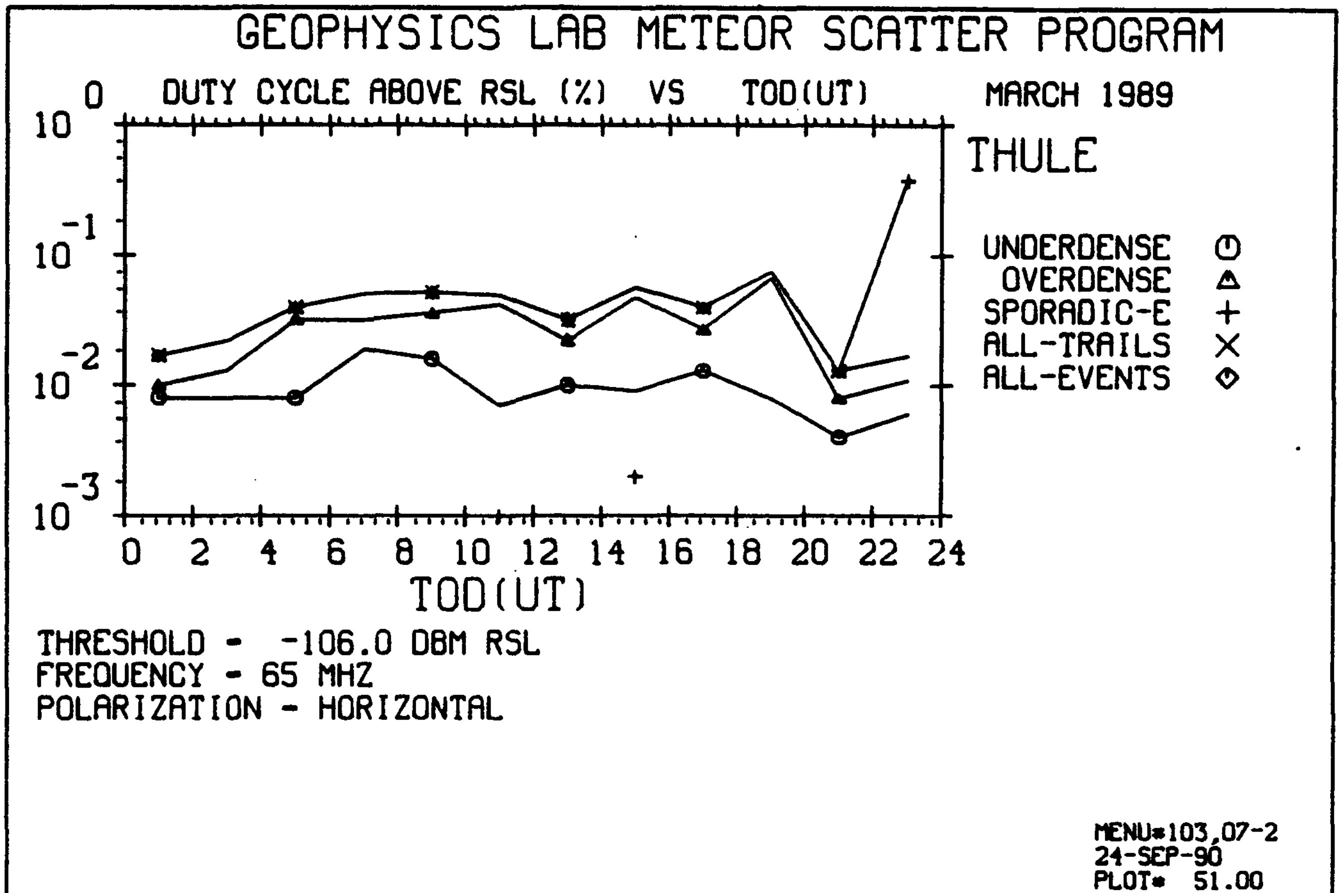

THRESHOLD - -106.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

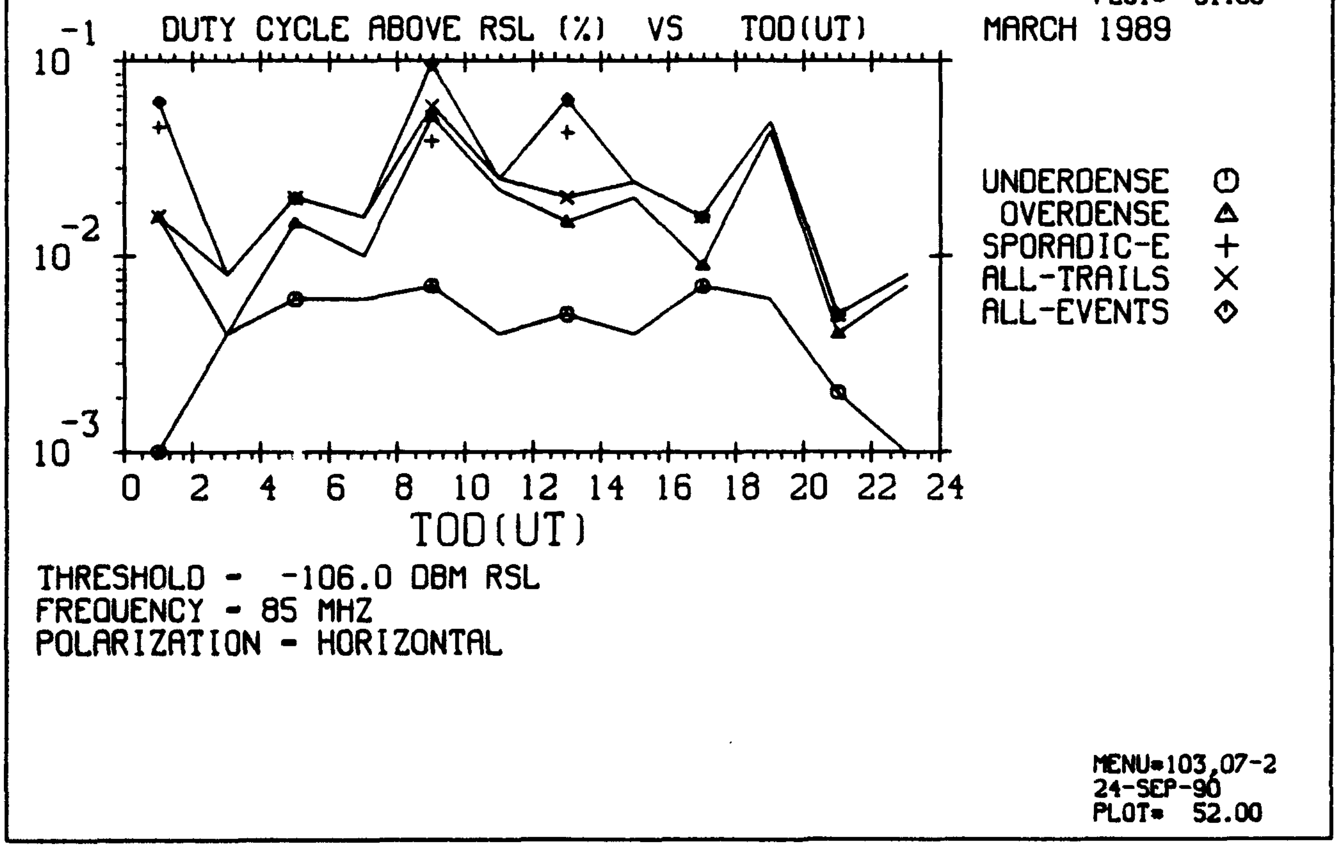
MENU=103,07-2
24-SEP-90
PLOT= 49.00



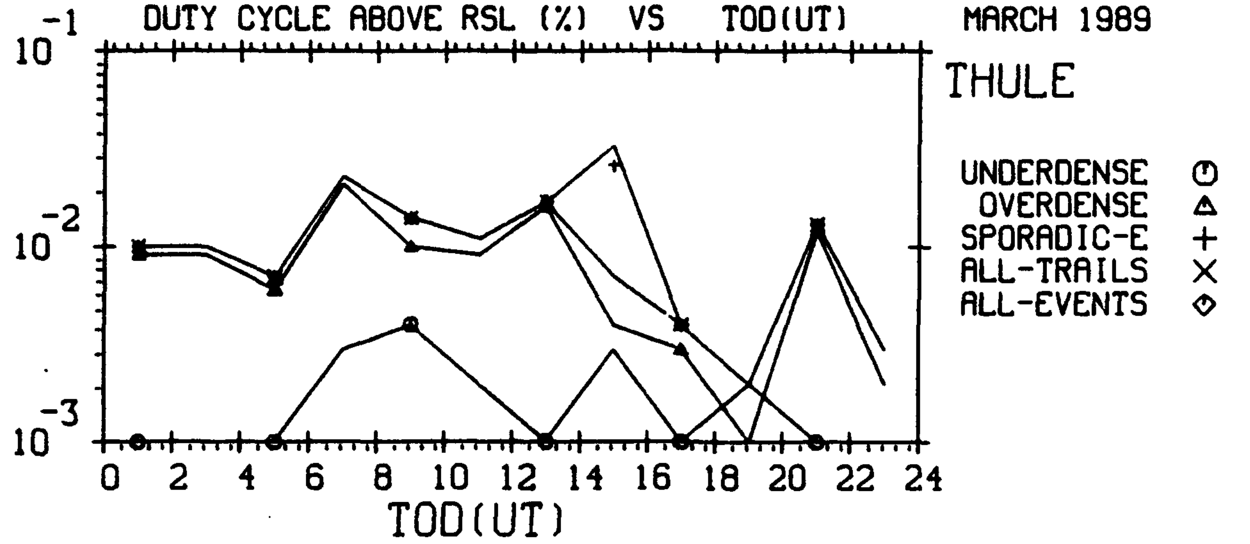

THRESHOLD - -106.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

MENU=103,07-2
24-SEP-90
PLOT= 50.00


GEOPHYSICS LAB METEOR SCATTER PROGRAM
DUTY CYCLE ABOVE RSL (%) VS TOD(UT)
MARCH 1989
THULE
UNDERDENSE
OVERDENSE
SPORADIC-E
ALL-TRAILS
ALL-EVENTS
TOD(UT)
THRESHOLD - -106.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MENU=103,07-2
24-SEP-90
PLOT= 51.00

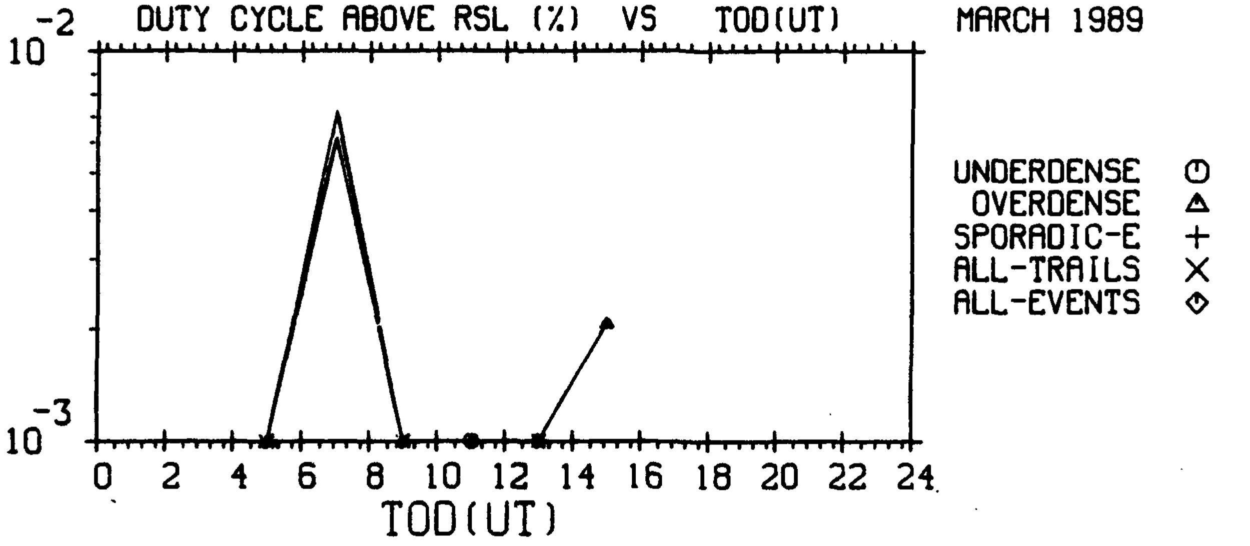

DUTY CYCLE ABOVE RSL (%) VS TOD(UT)
MARCH 1989
UNDERDENSE
OVERDENSE
SPORADIC-E
ALL-TRAILS
ALL-EVENTS
TOD(UT)
THRESHOLD - -106.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MENU=103,07-2
24-SEP-90
PLOT= 52.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

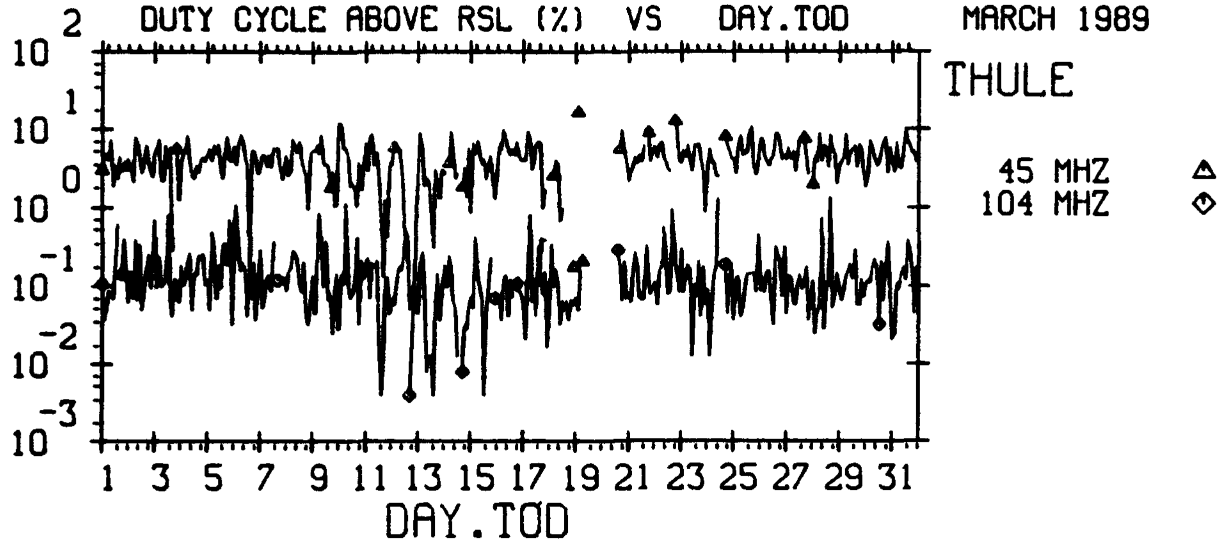
MENU=103,07-2
24-SEP-90
PLOT= 53.00




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

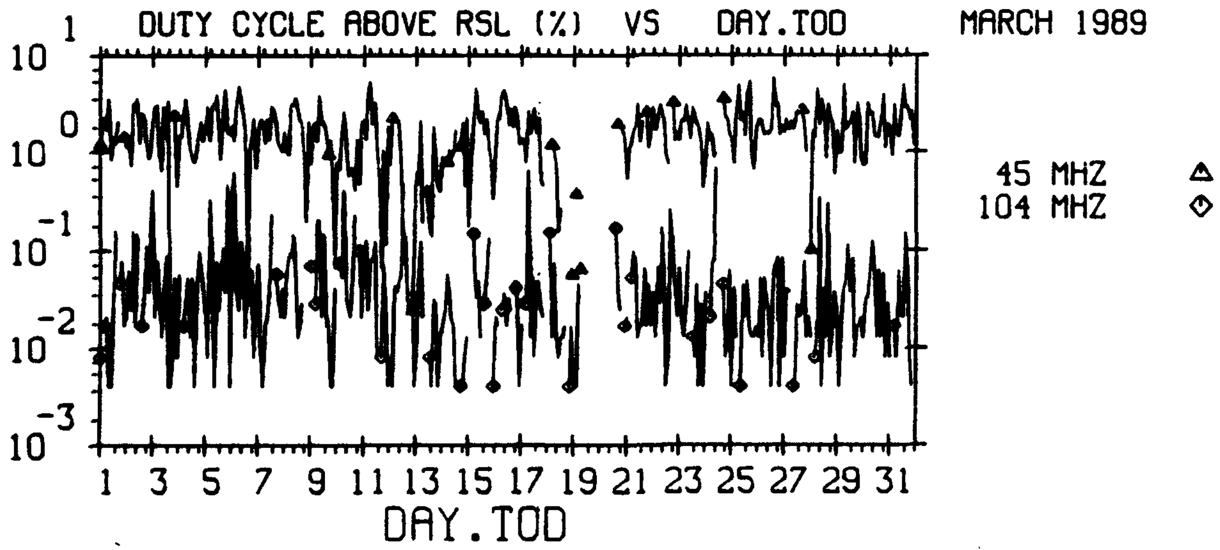
MENU=103,07-2
24-SEP-90
PLOT= 54.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
POLARIZATION - HORIZONTAL

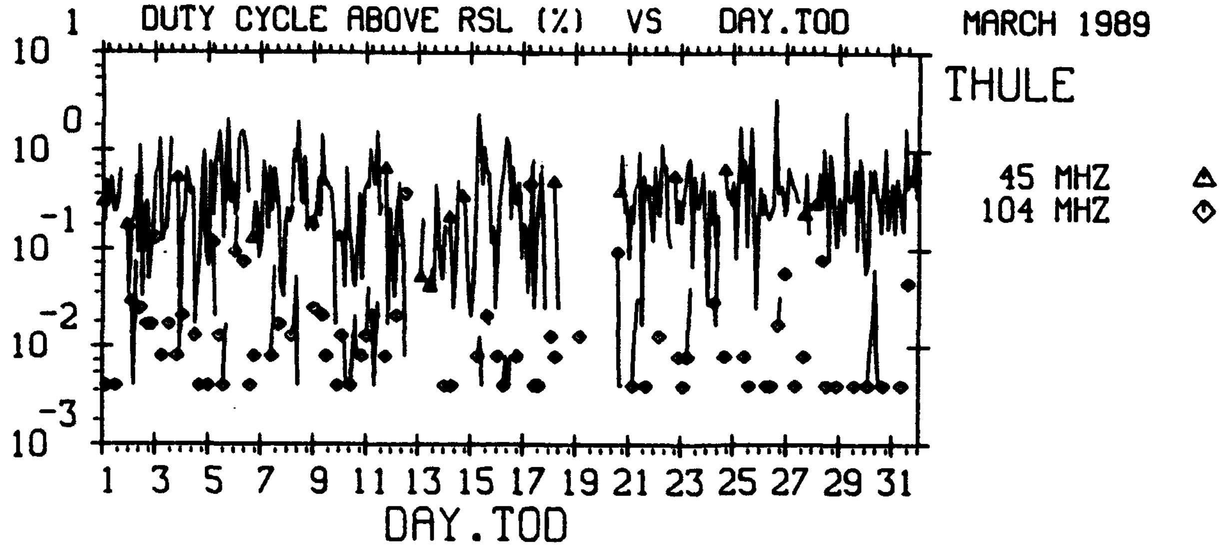
MENU=103,09-2
24-SEP-90
PLOT= 55.00




THRESHOLD - -116.0 DBM RSL
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
POLARIZATION - HORIZONTAL

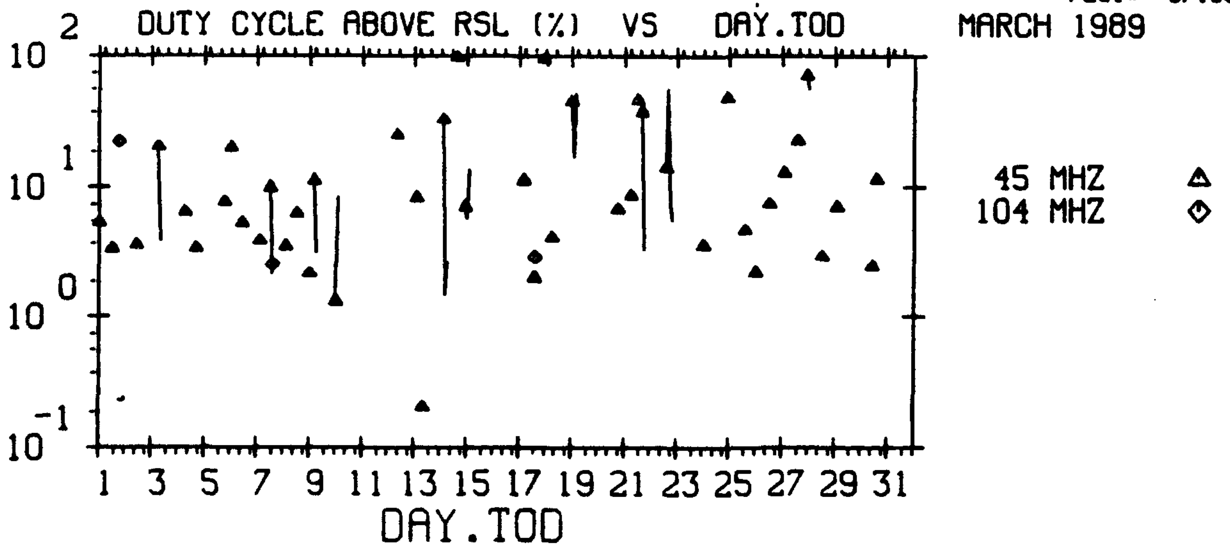
MENU=103,09-2
24-SEP-90
PLOT= 56.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -106.0 DBM RSL
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
POLARIZATION - HORIZONTAL

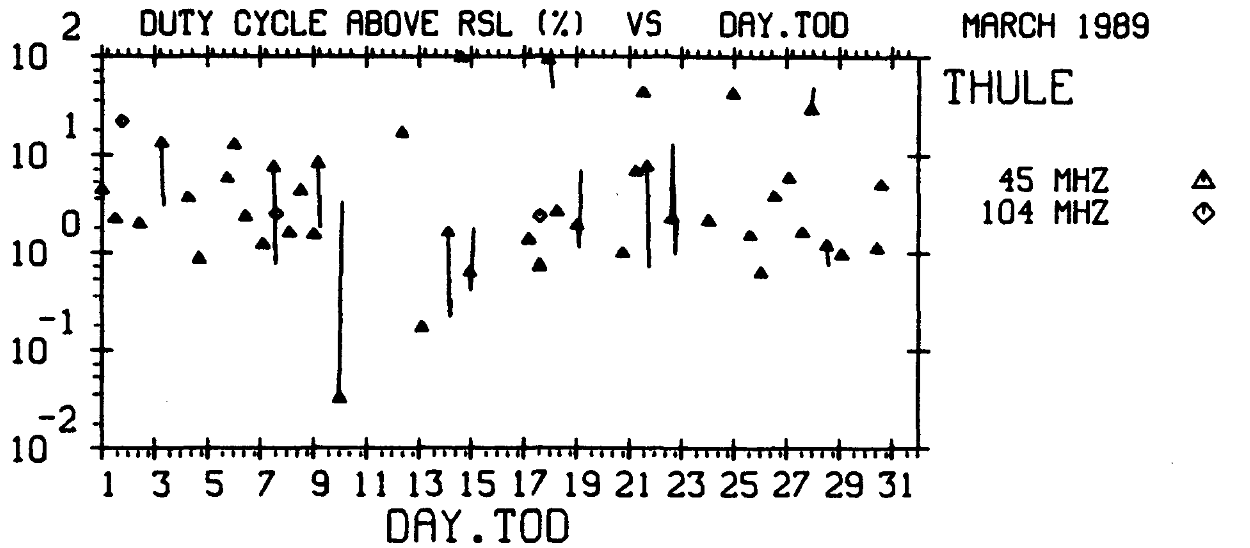
MENU=103,09-2
24-SEP-90
PLOT= 57.00




THRESHOLD - -126.0 DBM RSL
THE EVENT CLASS IS SPORADIC-E
POLARIZATION - HORIZONTAL

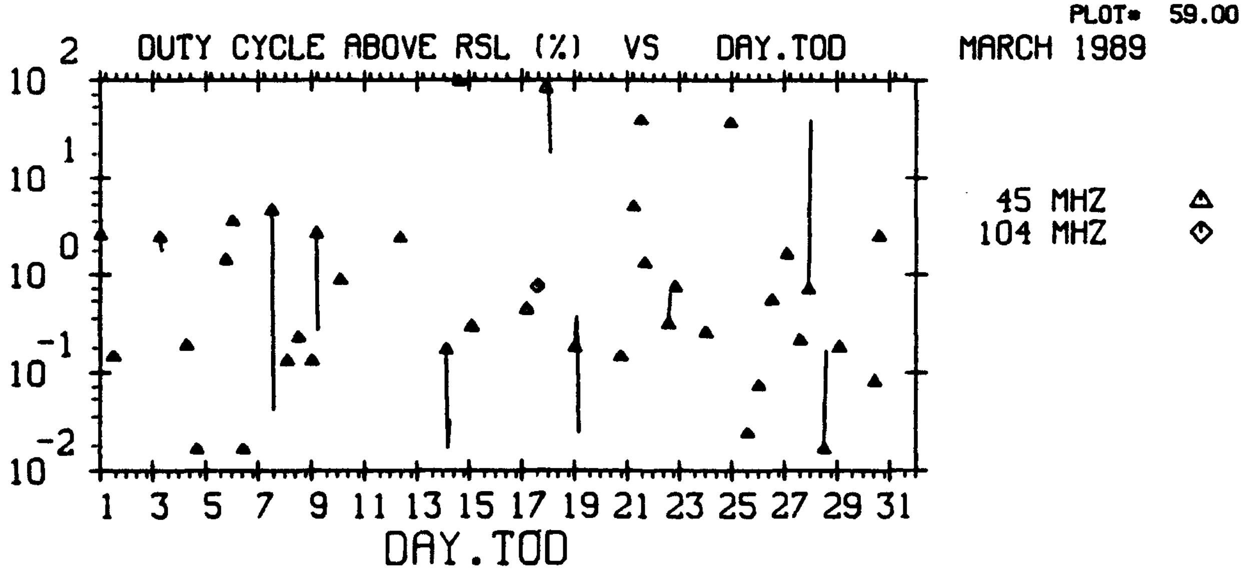
MENU=103,09-2
24-SEP-90
PLOT= 58.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
THE EVENT CLASS IS SPORADIC-E
POLARIZATION - HORIZONTAL

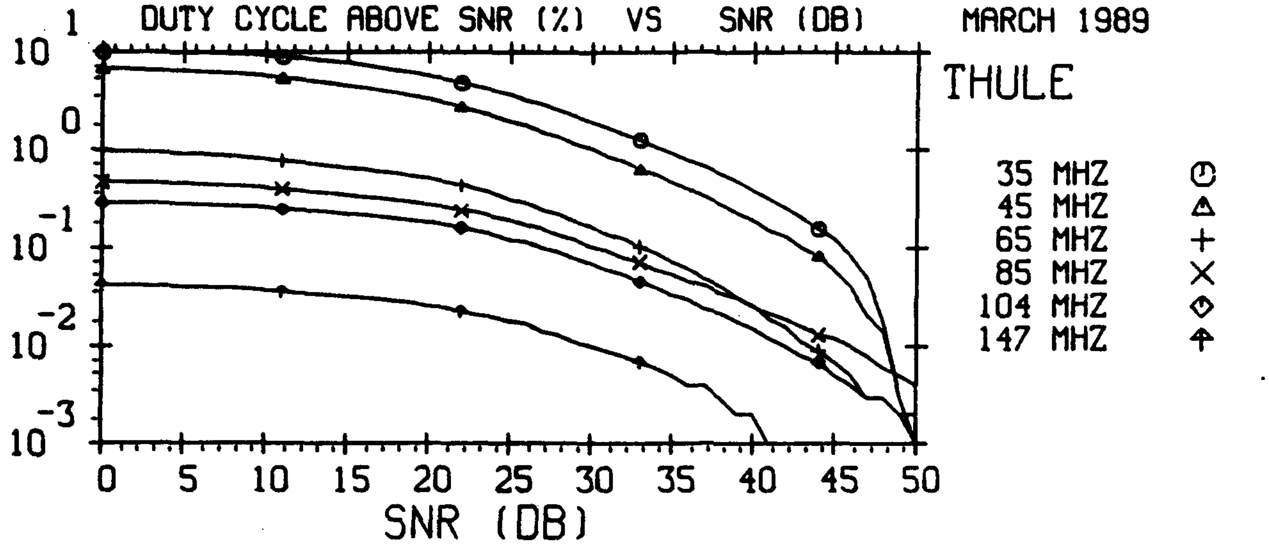
MENU=103,09-2
24-SEP-90
PLOT= 59.00




THRESHOLD - -106.0 DBM RSL
THE EVENT CLASS IS SPORADIC-E
POLARIZATION - HORIZONTAL

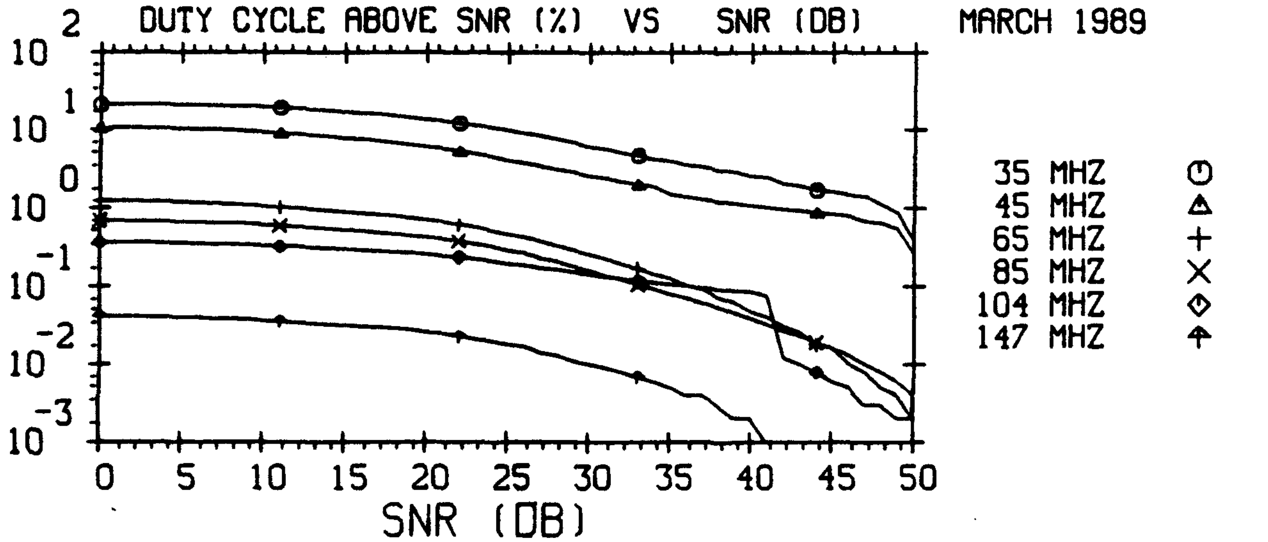
MENU=103,09-2
24-SEP-90
PLOT= 60.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

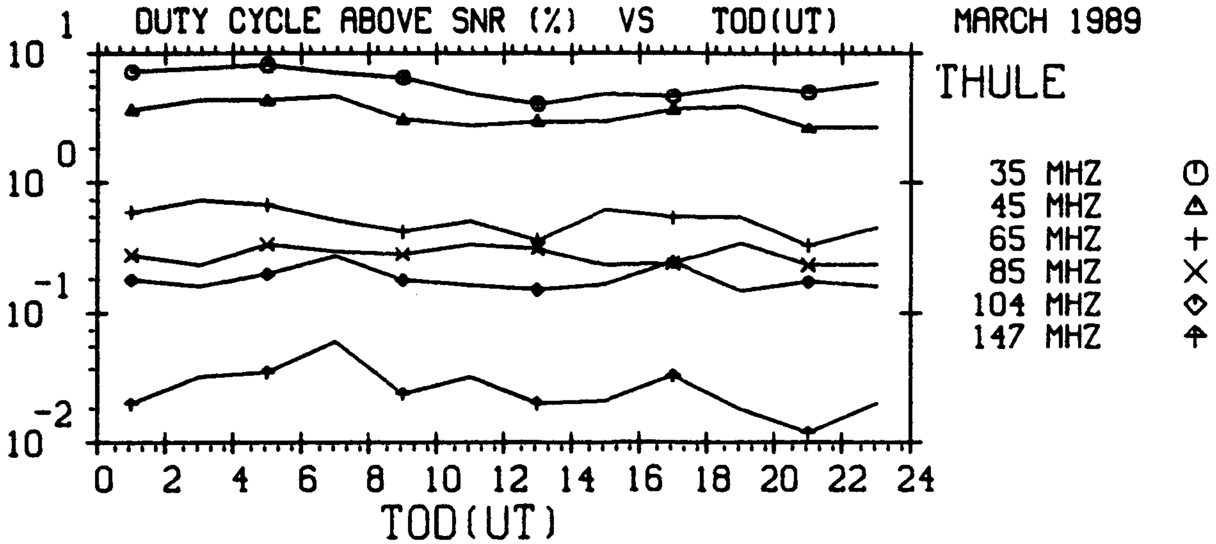
MENU=104,02-2
24-SEP-90
PLOT= 61.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

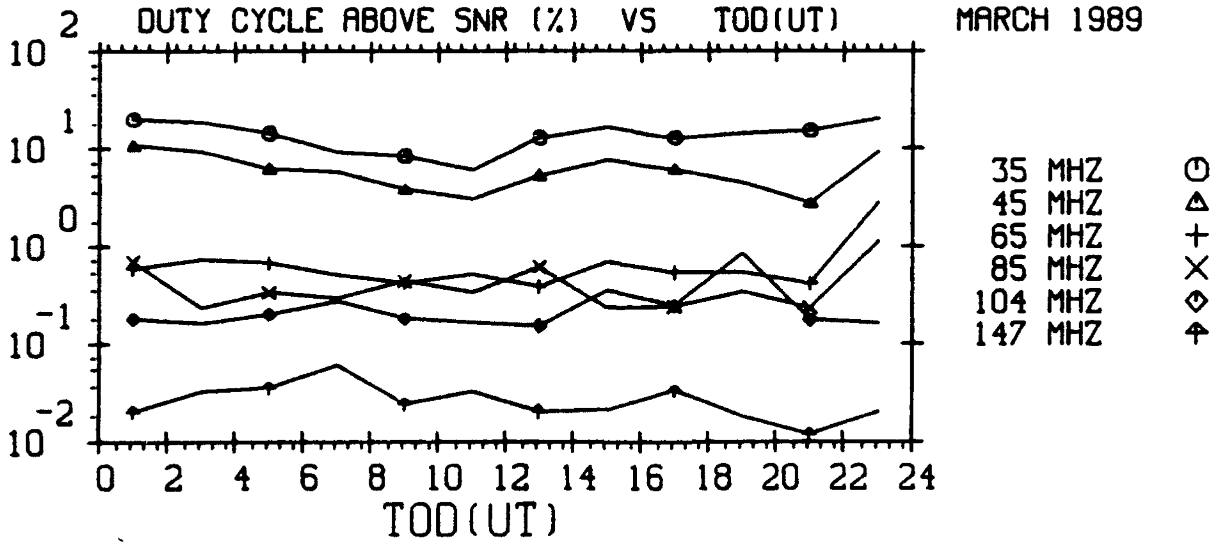
MENU=104,02-2
24-SEP-90
PLOT= 62.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

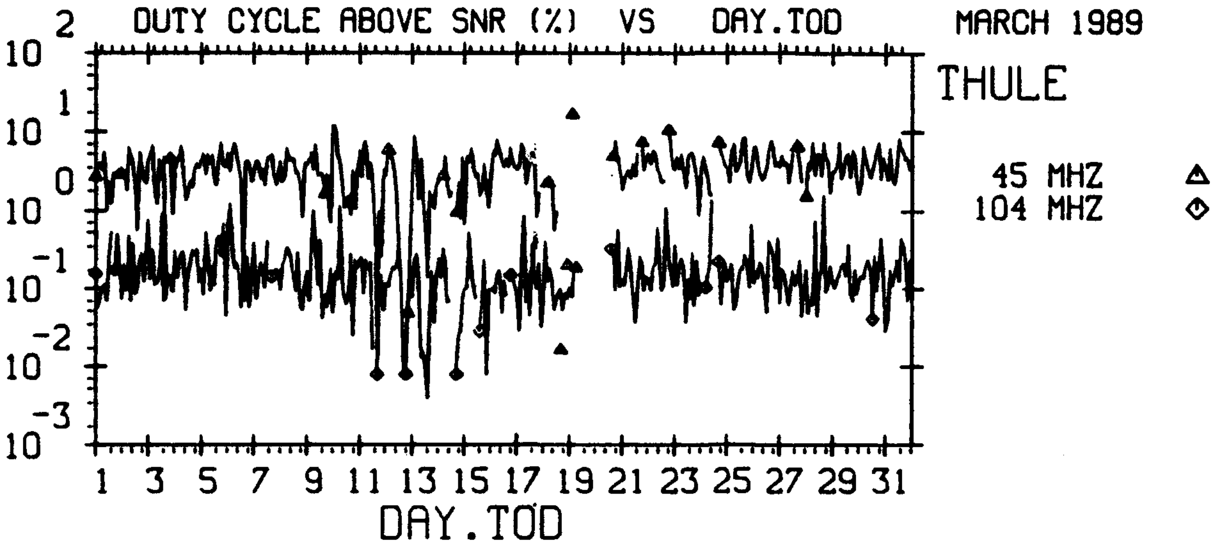
MENU=104,03-2
24-SEP-90
PLOT= 63.00




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

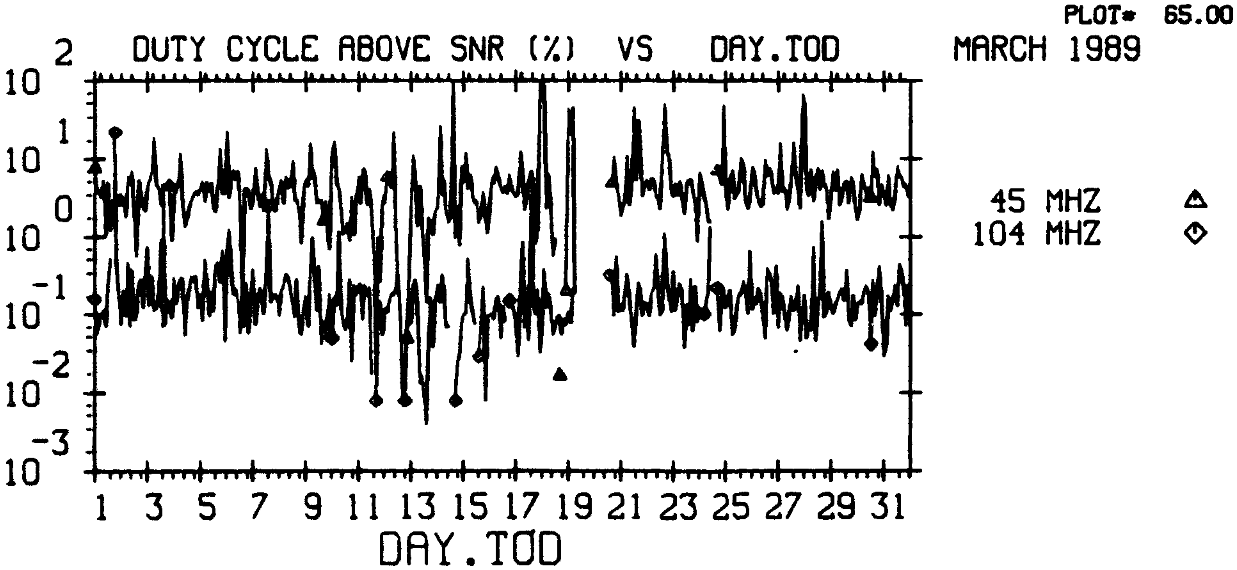
MENU=104,03-2
24-SEP-90
PLOT= 64.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

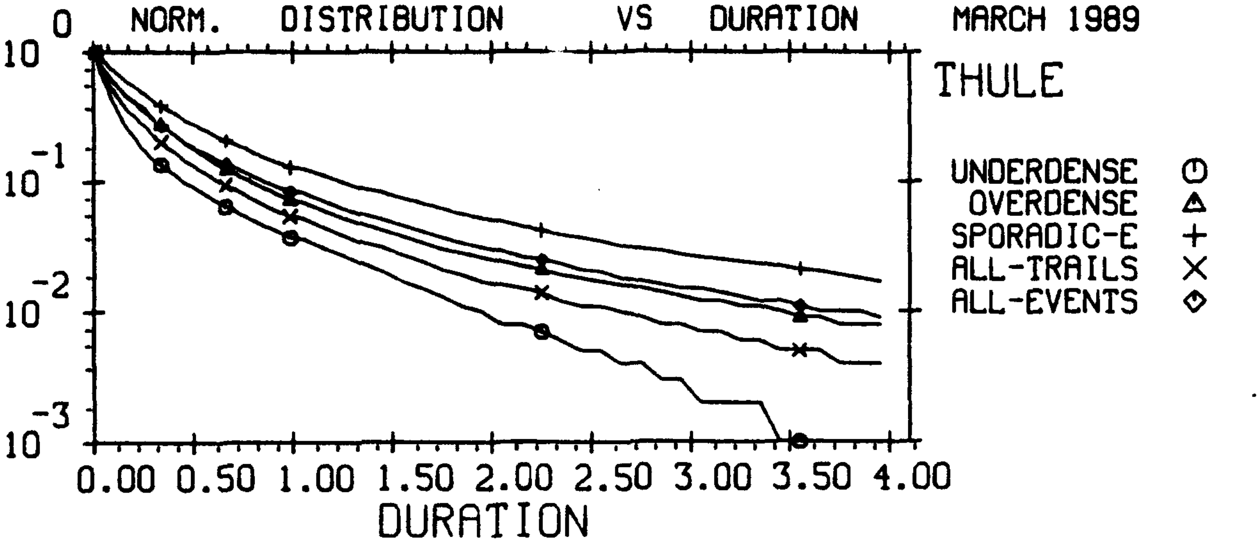
MENU=104,09-2
24-SEP-90
PLOT= 65.00




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

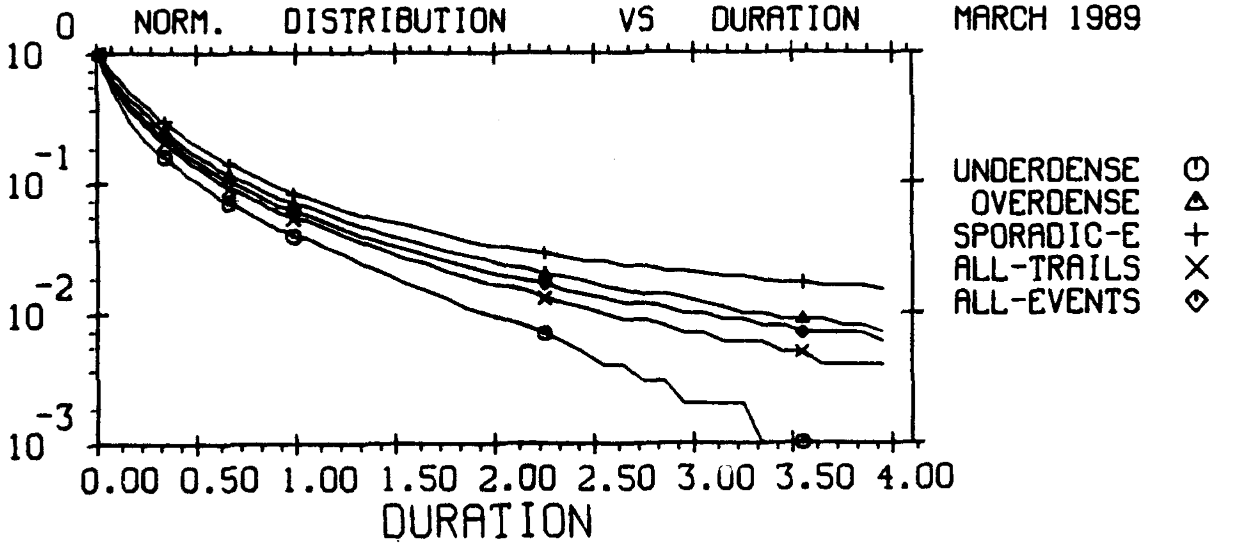
MENU=104,09-2
24-SEP-90
PLOT= 66.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER - 36124. OVER - 33074. SPOR-E - 44016.
TRAILS - 69198. EVENTS - 113214.

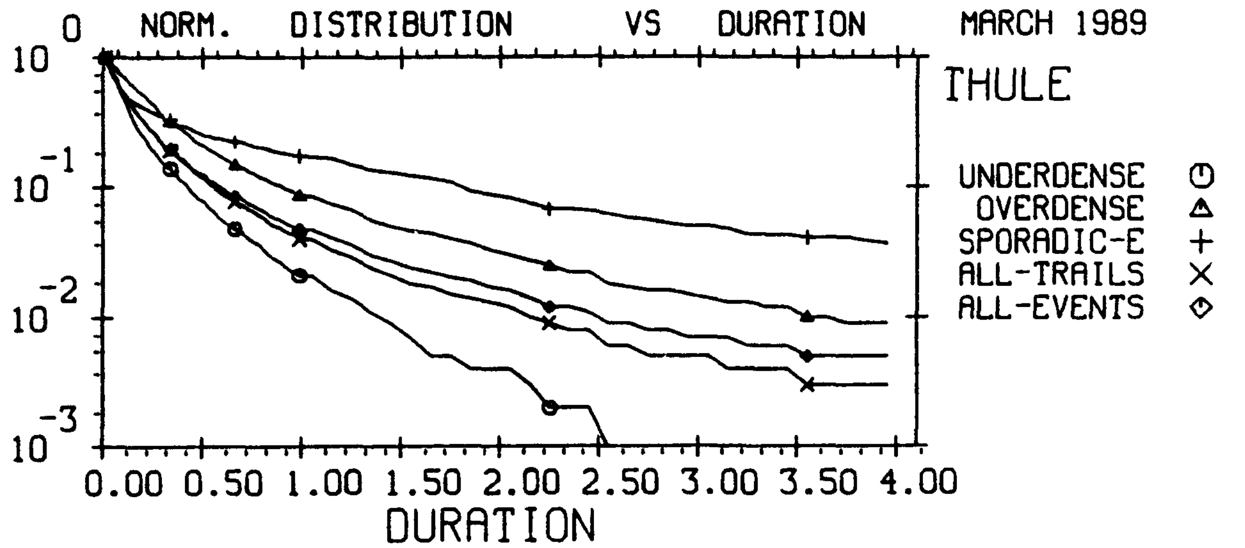
MENU=106,02-4
24-SEP-90
PLOT= 67.00




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER - 18025. OVER - 16473. SPOR-E - 9704.
TRAILS - 34498. EVENTS - 44202.

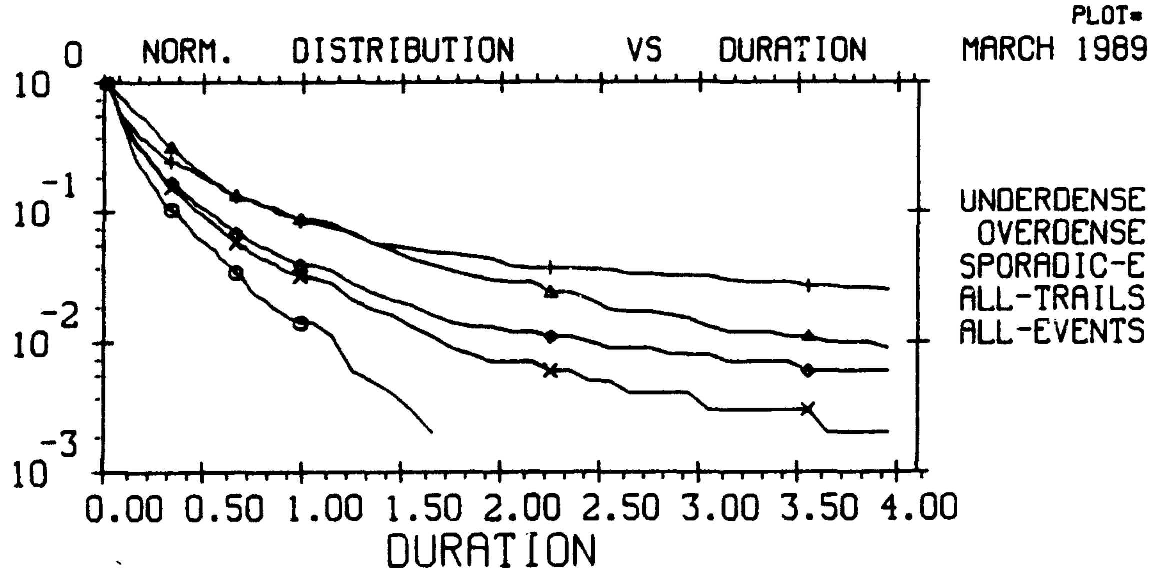
MENU=106,02-4
24-SEP-90
PLOT= 68.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER - 5626. OVER - 2321. SPOR-E - 483.
TRAILS - 7947. EVENTS - 8430.

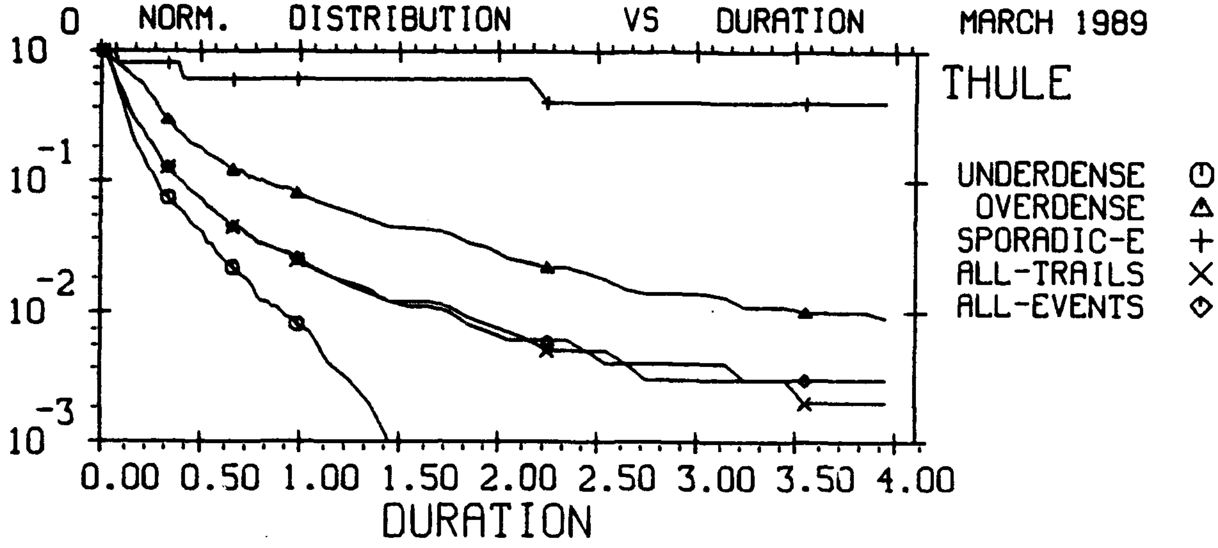
MENU=106,02-4
24-SEP-90
PLOT= 69.00




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER - 3159. OVER - 1012. SPOR-E - 728.
TRAILS - 4171. EVENTS - 4899.

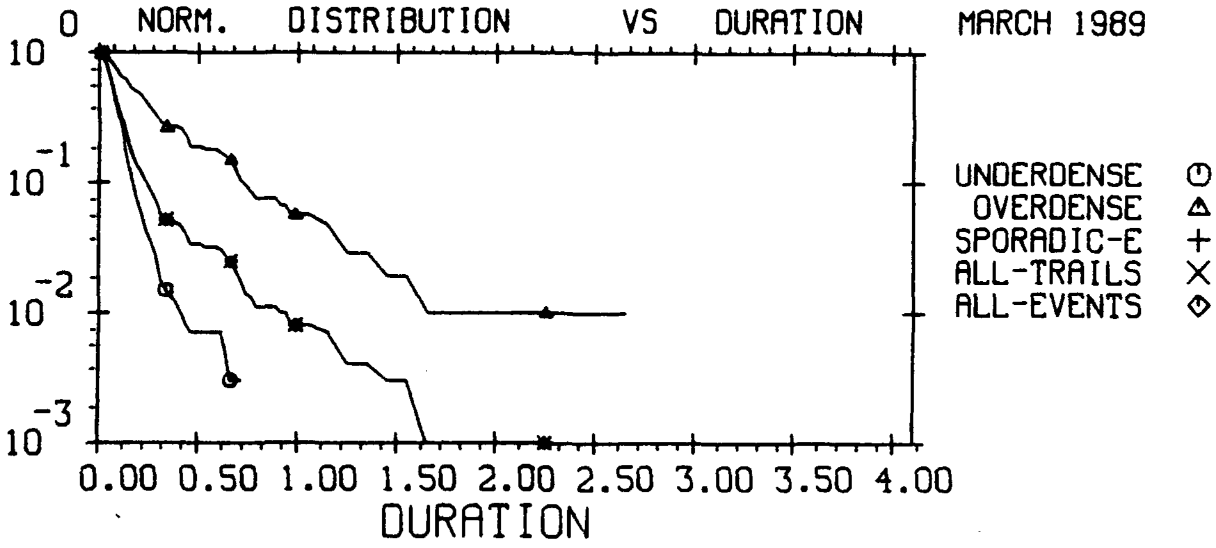
MENU=106,02-4
24-SEP-90
PLOT= 70.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER - 2968. OVER - 914. SPOR-E - 5.
TRAILS - 3882. EVENTS - 3887.

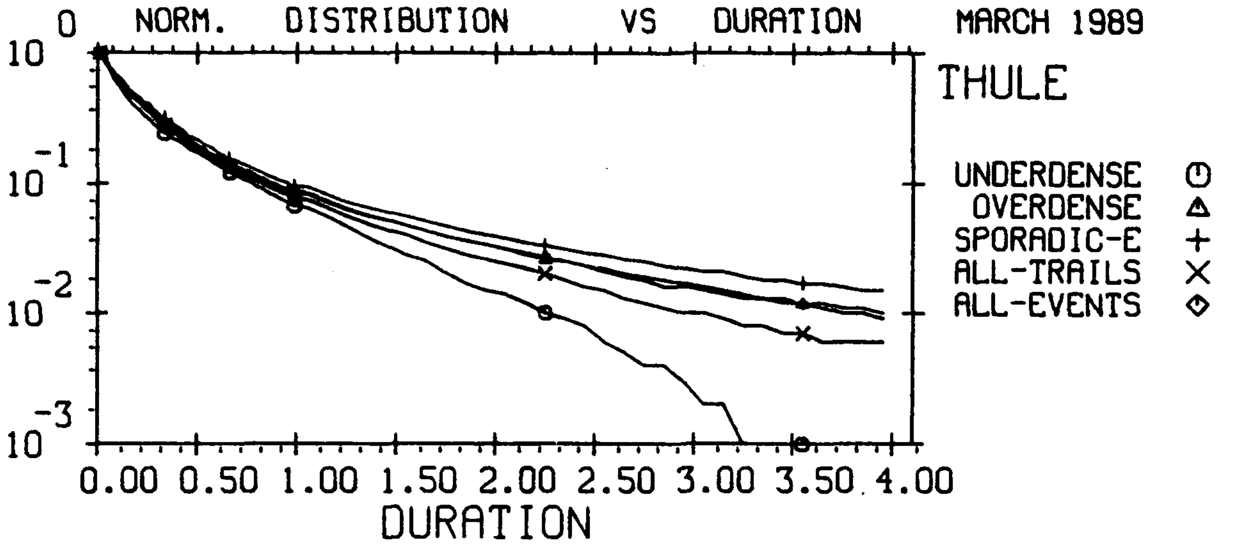
MENU*106,02-4
24-SEP-90
PLOT* 71.00




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER - 603. OVER - 105. SPOR-E - 0.
TRAILS - 708. EVENTS - 708.

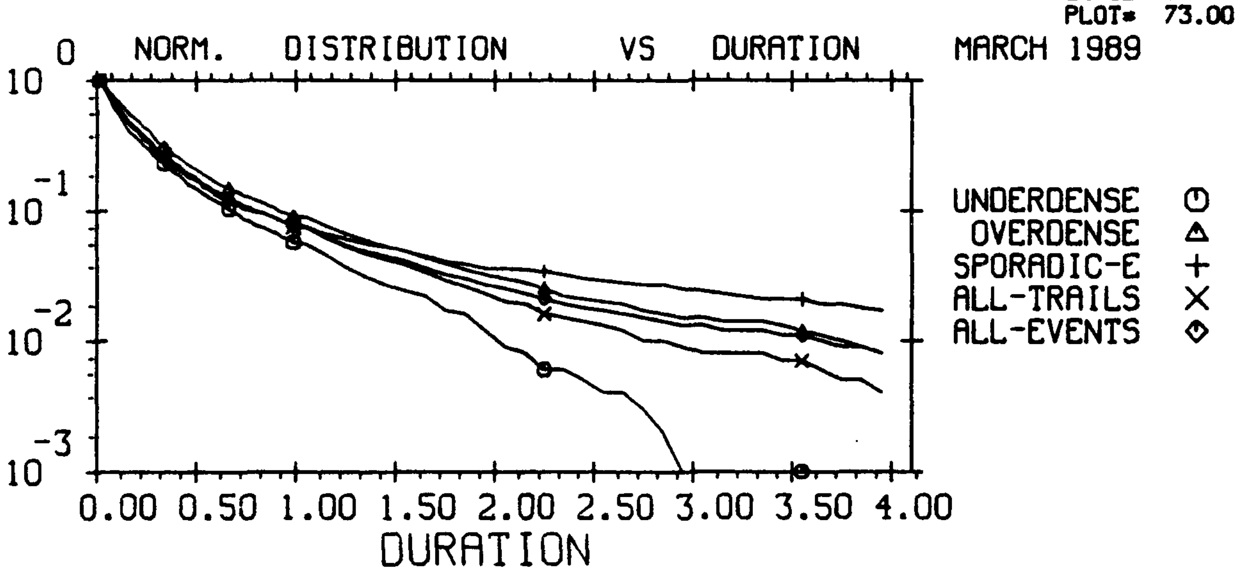
MENU*106,02-4
24-SEP-90
PLOT* 72.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER - 9615. OVER - 13627. SPOR-E - 25723.
TRAILS - 23242. EVENTS - 48965.

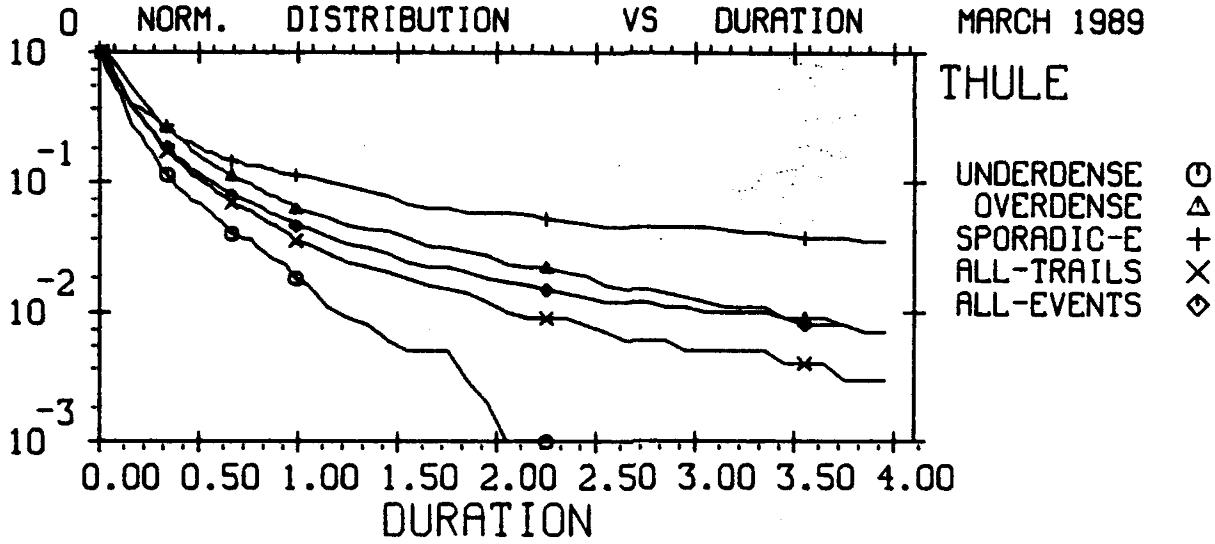
MENU=106,02-4
24-SEP-90
PLOT= 73.00




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER - 5049. OVER - 5842. SPOR-E - 4142.
TRAILS - 10891. EVENTS - 15033.

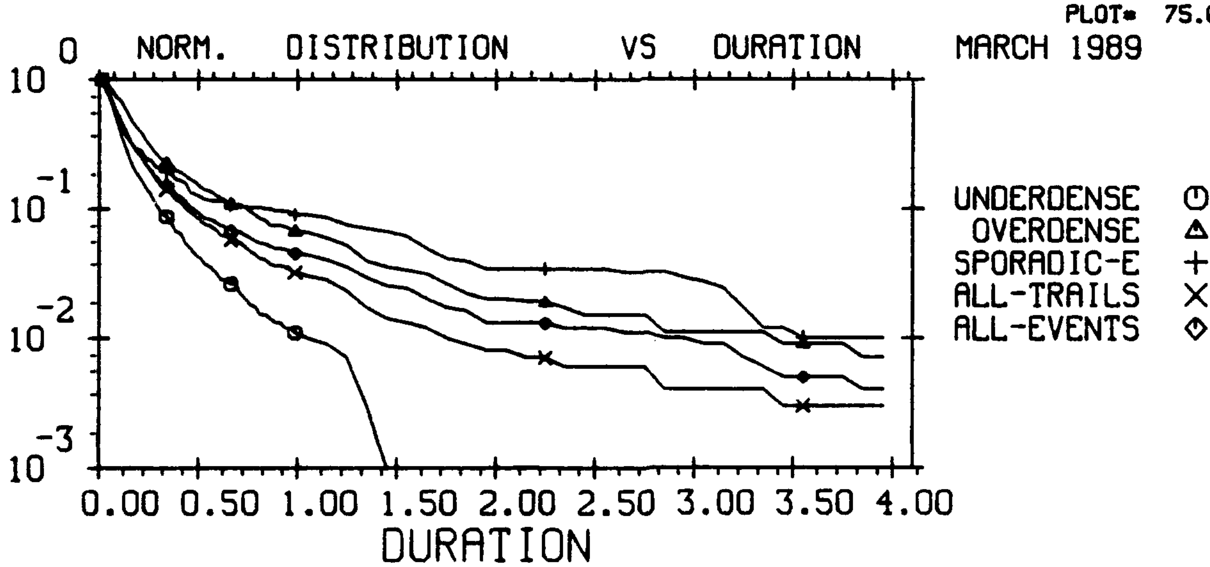
MENU=106,02-4
24-SEP-90
PLOT= 74.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER - 1770. OVER - 1200. SPOR-E - 462.
TRAILS - 2970. EVENTS - 3432.

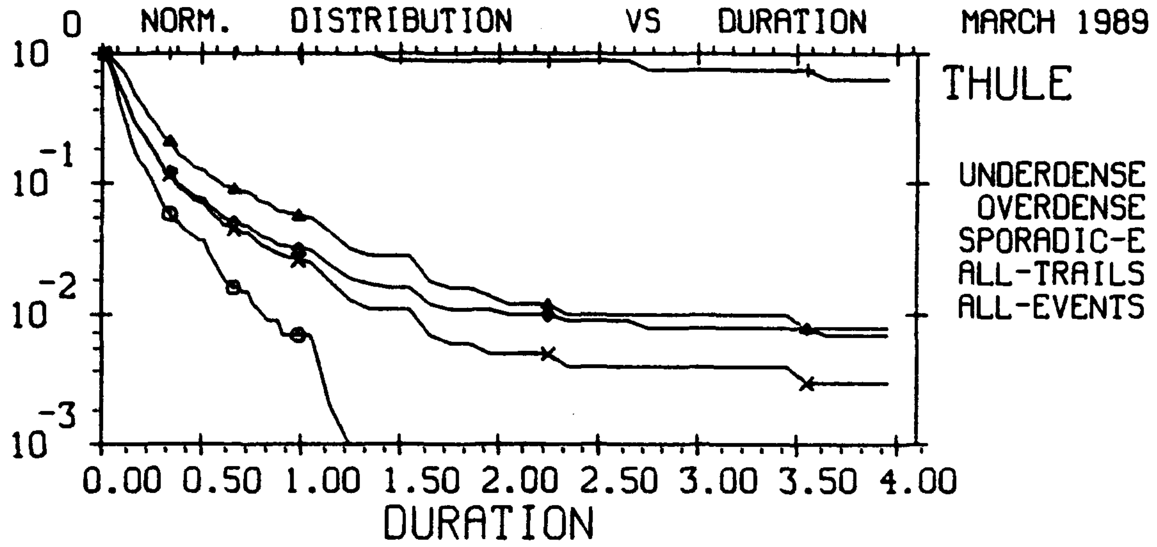
MENU*106,02-4
24-SEP-90
PLOT* 75.00




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER - 907. OVER - 540. SPOR-E - 412.
TRAILS - 1447. EVENTS - 1859.

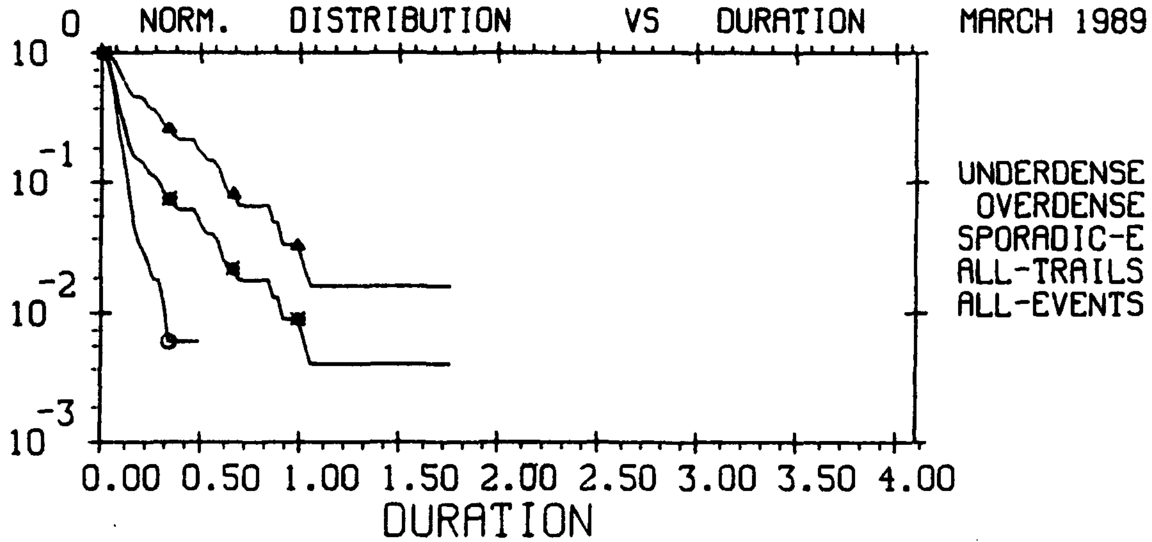
MENU*106,02-4
24-SEP-90
PLOT* 76.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER - 804. OVER - 493. SPOR-E - 8.
TRAILS - 1297. EVENTS - 1305.

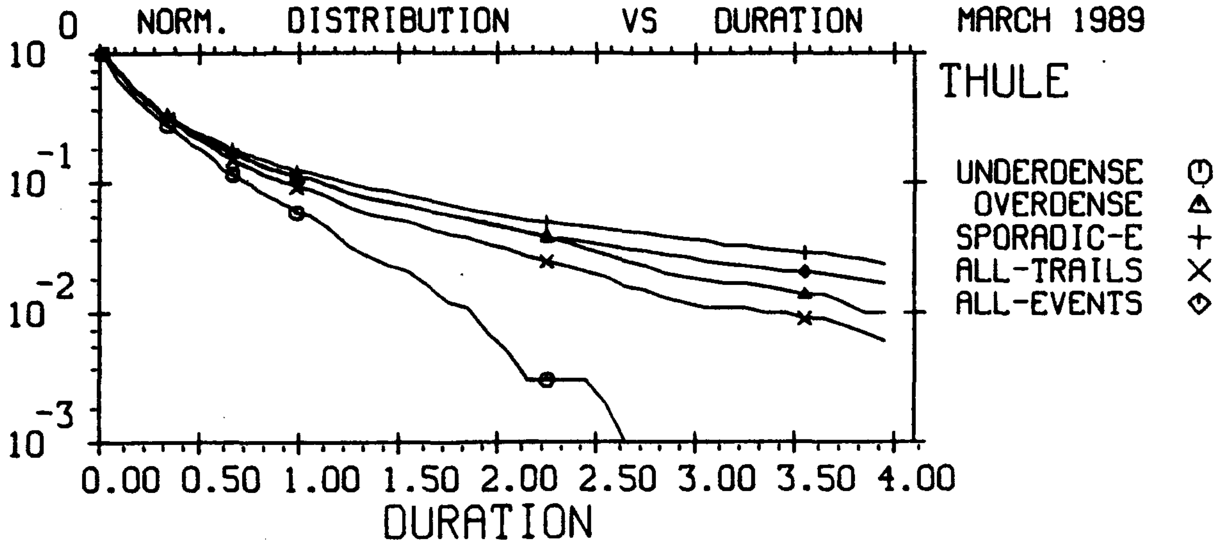
MENU=106,02-4
24-SEP-90
PLOT= 77.00




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER - 166. OVER - 61. SPOR-E - 0.
TRAILS - 227. EVENTS - 227.

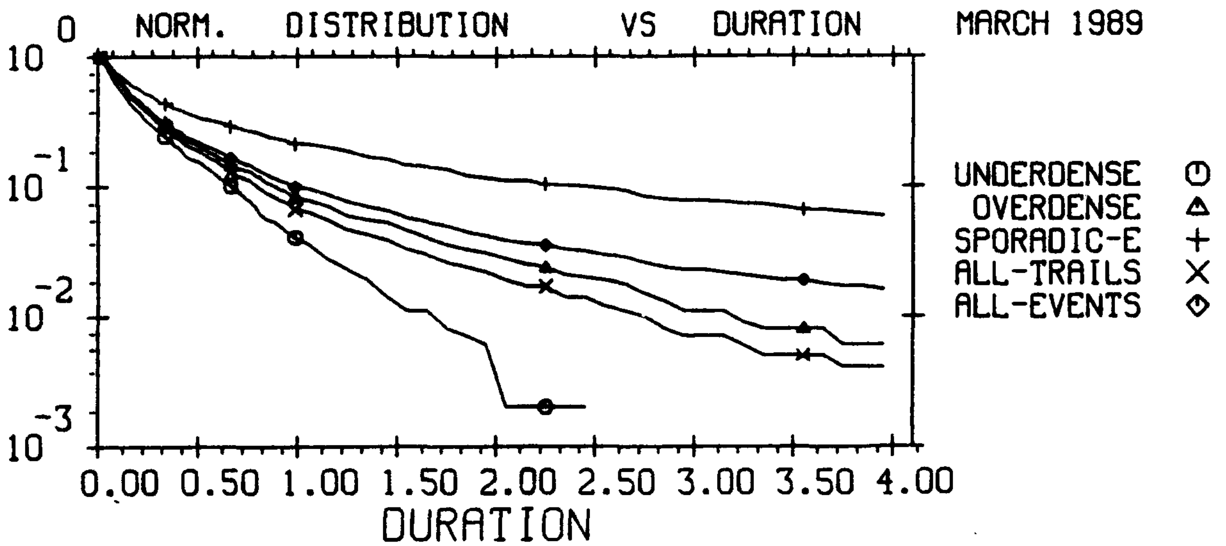
MENU=106,02-4
24-SEP-90
PLOT= 78.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER - 1805. OVER - 3178. SPOR-E - 6674.
TRAILS - 4983. EVENTS - 11657.

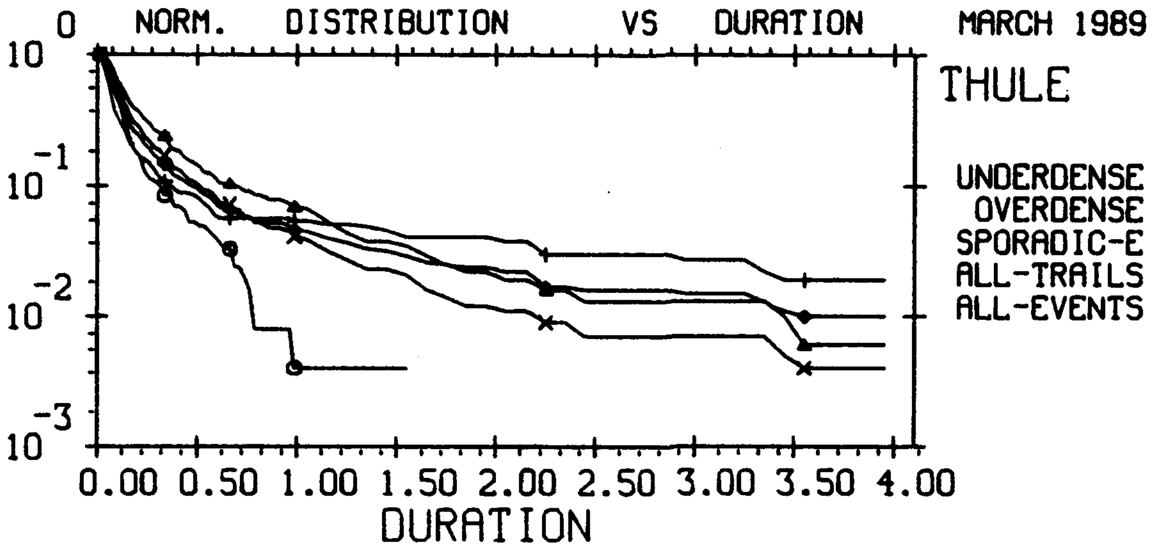
MENU=106,02-4
24-SEP-90
PLOT= 79.00




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER - 888. OVER - 1594. SPOR-E - 699.
TRAILS - 2482. EVENTS - 3181.

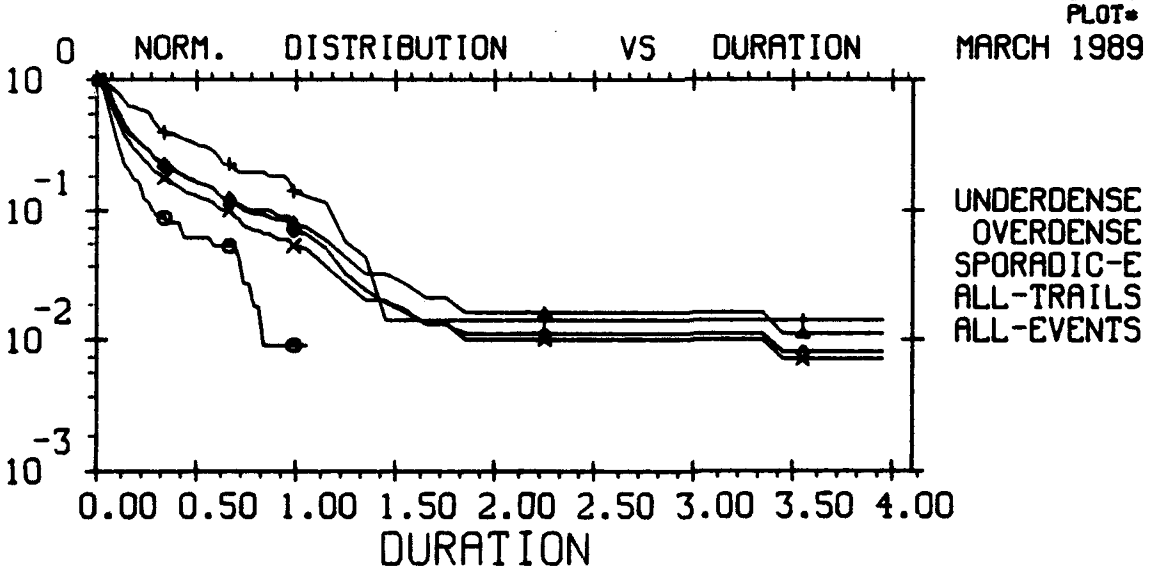
MENU=106,02-4
24-SEP-90
PLOT= 80.00

## GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER - 246. OVER - 315. SPOR-E - 369.
TRAILS - 561. EVENTS - 930.

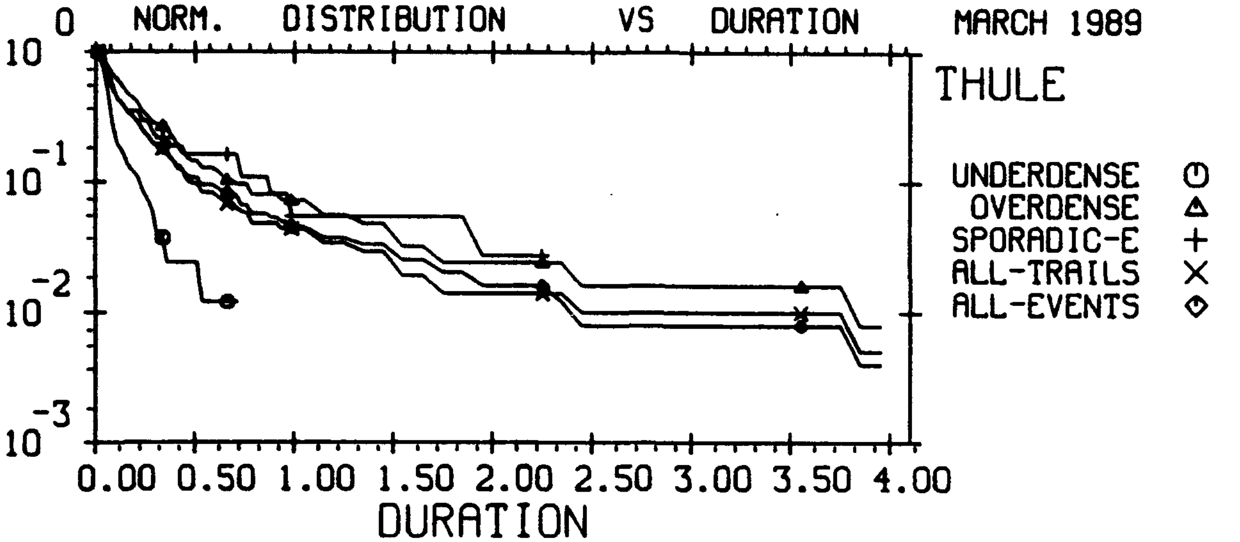
MENU=106,02-4
24-SEP-90
PLOT= 81.00




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER - 113. OVER - 188. SPOR-E - 70.
TRAILS - 301. EVENTS - 371.

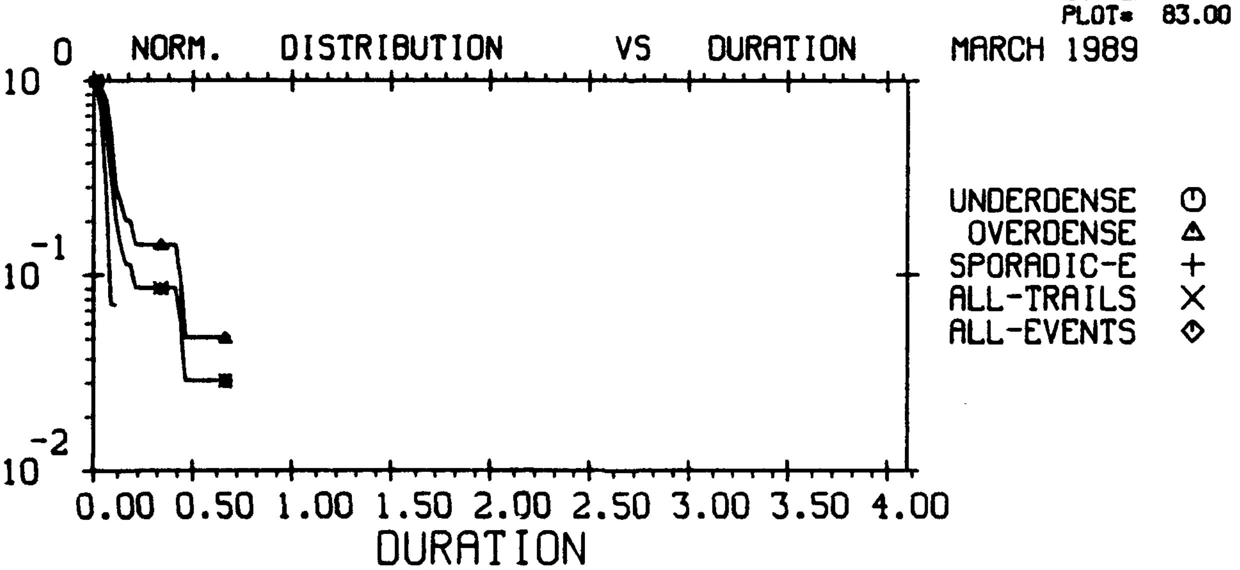
MENU=106,02-4
24-SEP-90
PLOT= 82.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER - 82. OVER - 125. SPOR-E - 37.
TRAILS - 207. EVENTS - 244.

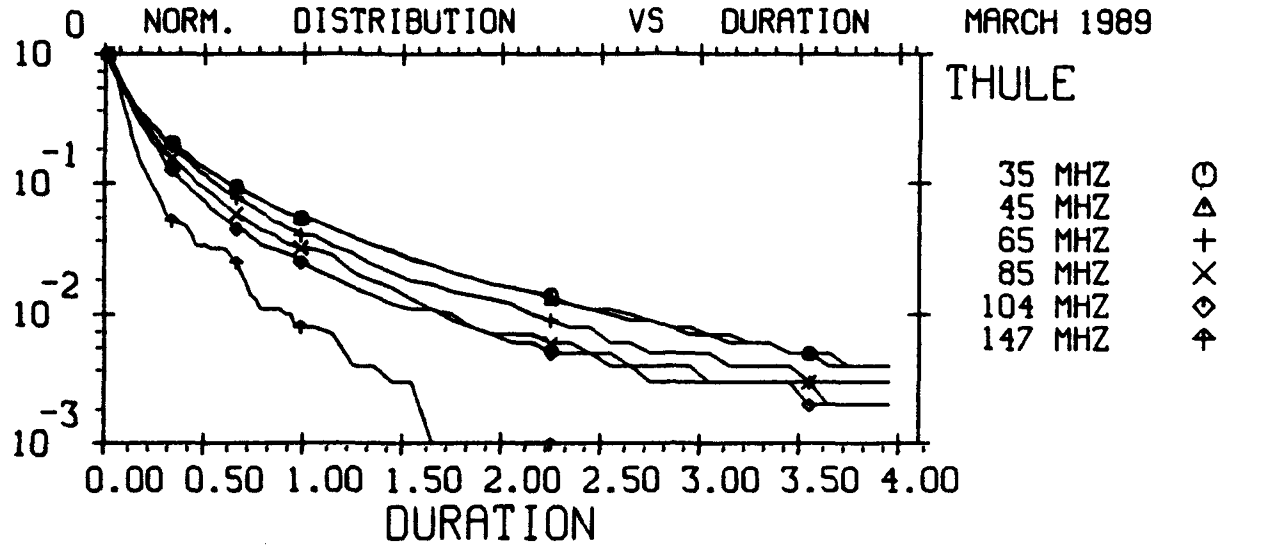
MENU=106,02-4
24-SEP-90
PLOT= 83.00




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER - 14. OVER - 21. SPOR-E - 0.
TRAILS - 35. EVENTS - 35.

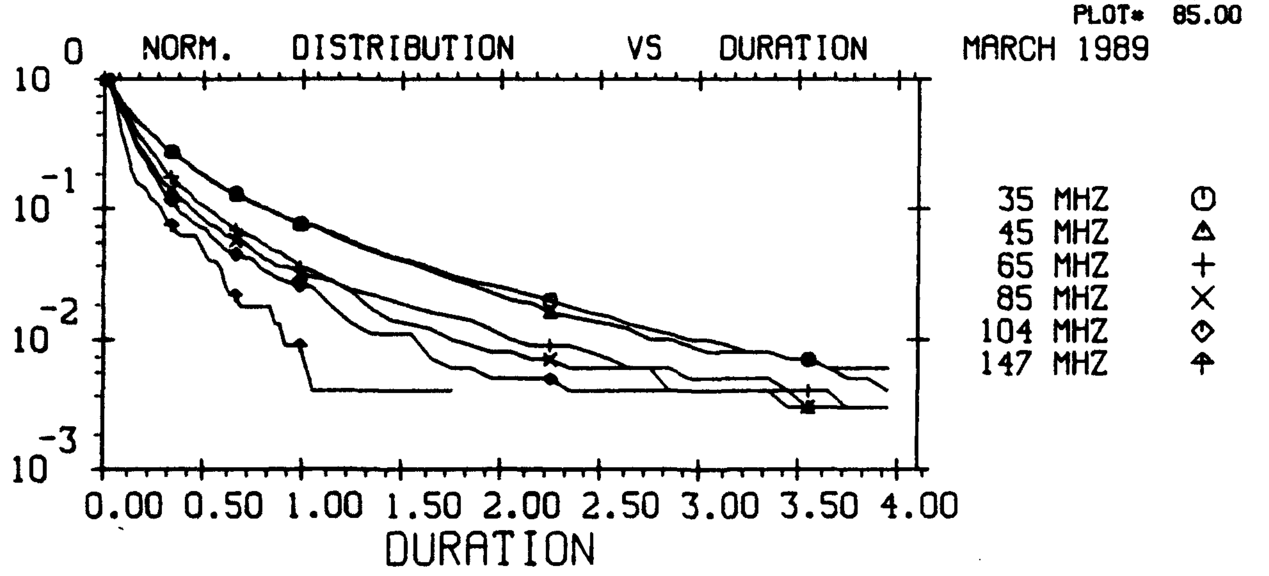
MENU=106,02-4
24-SEP-90
PLOT= 84.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ - 69198. 45MHZ - 34498. 65MHZ - 7947.
85MHZ - 4171. 104MHZ - 3882. 147MHZ - 708.

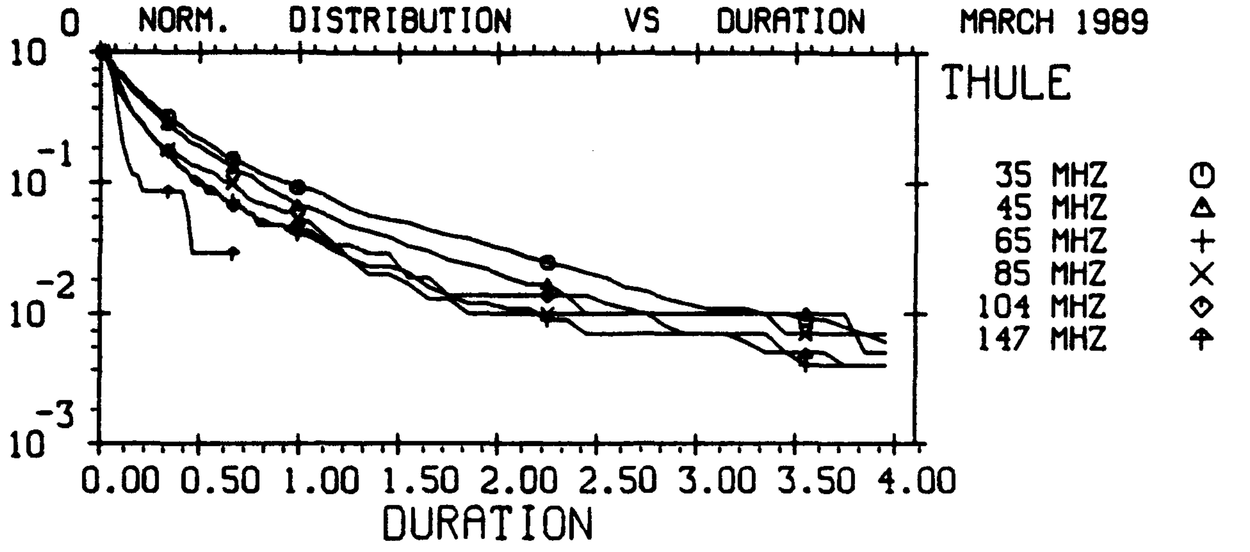
MENU=106,01-4
24-SEP-90
PLOT= 85.00




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ - 23242. 45MHZ - 10891. 65MHZ - 2970.
85MHZ - 1447. 104MHZ - 1297. 147MHZ - 227.

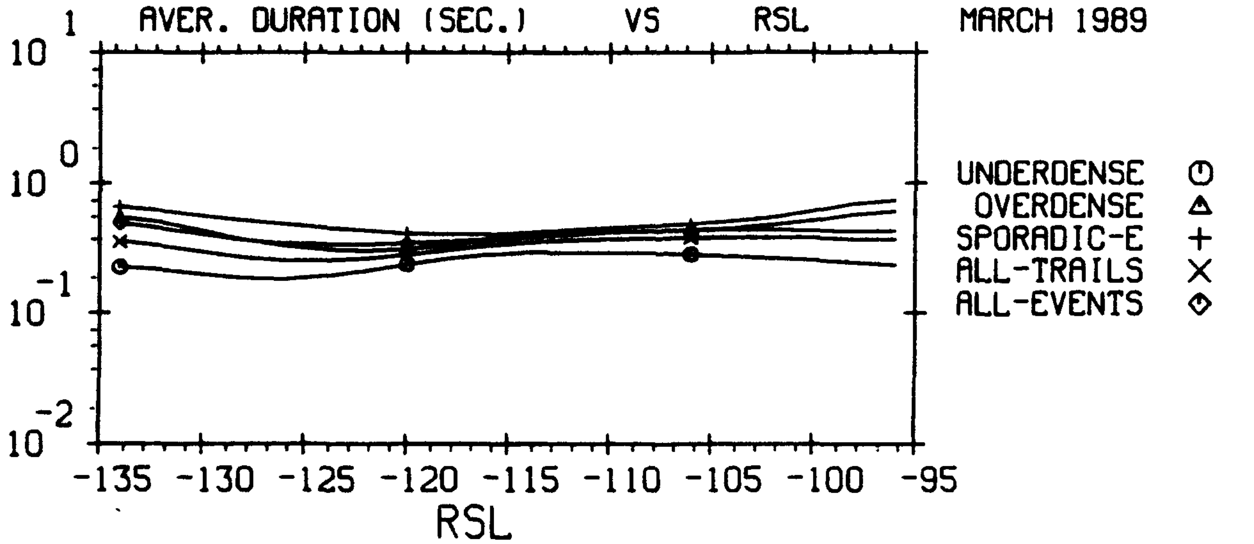
MENU=106,01-4
24-SEP-90
PLOT= 86.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ - 4983. 45MHZ - 2482. 65MHZ - 561.
85MHZ - 301. 104MHZ - 207. 147MHZ - 35.

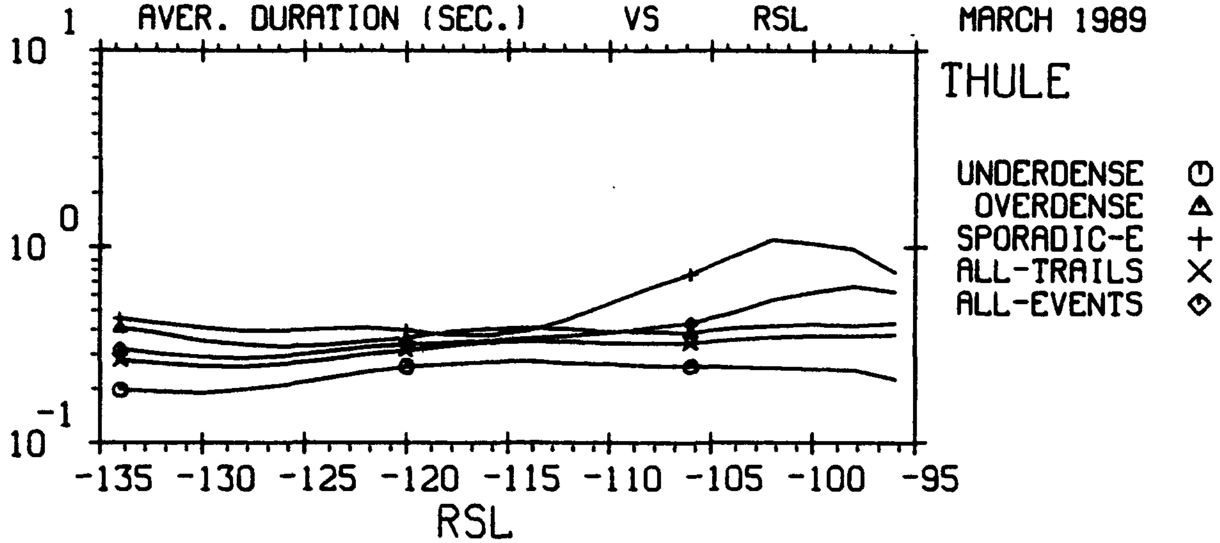
MENU=106,01-4
24-SEP-90
PLOT= 87.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ

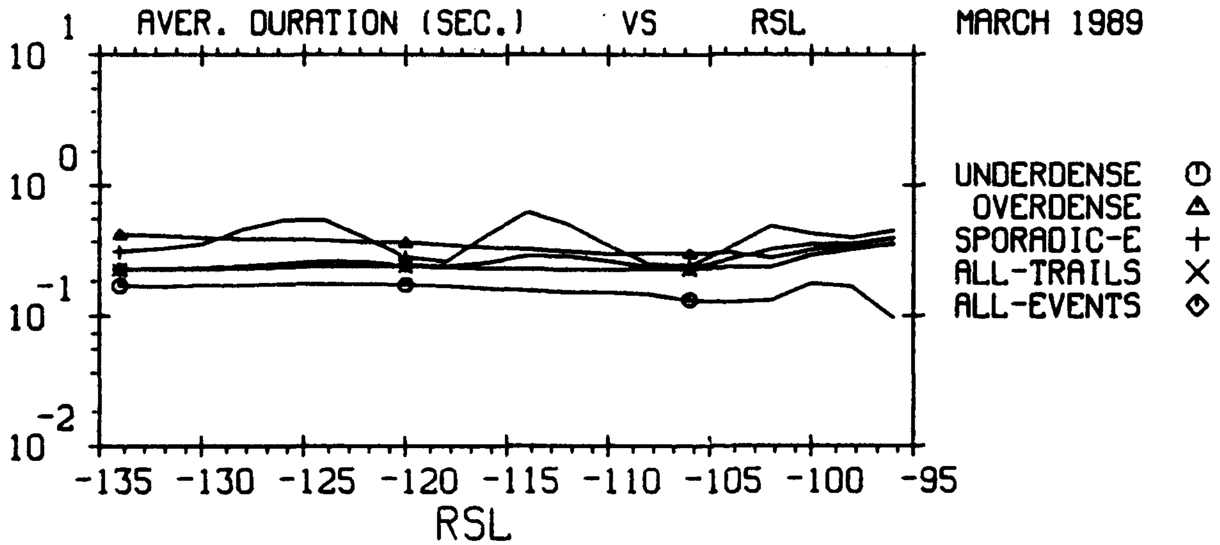
MENU=106,06-1
24-SEP-90
PLOT= 88.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ

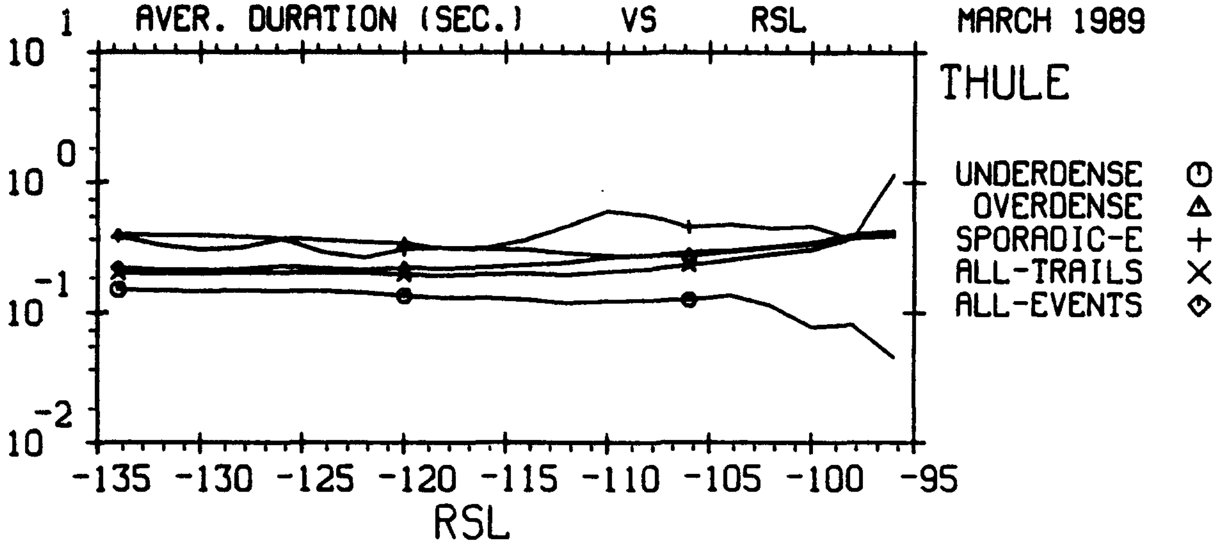
MENU=106,06-1
24-SEP-90
PLOT= 89.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ

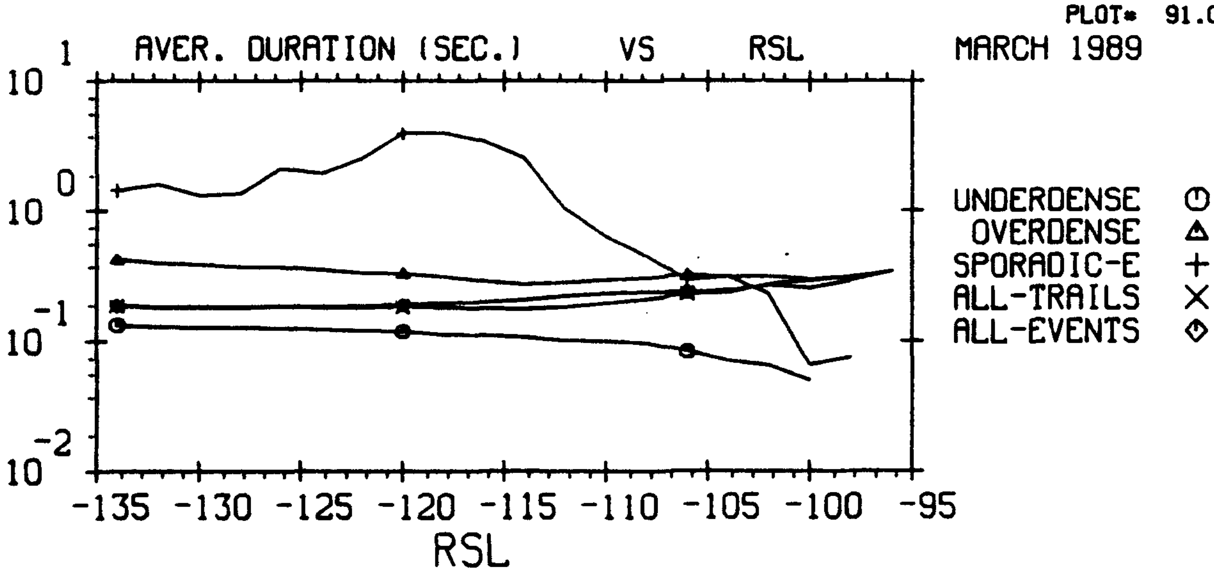
MENU=106,06-1
24-SEP-90
PLOT= 90.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ

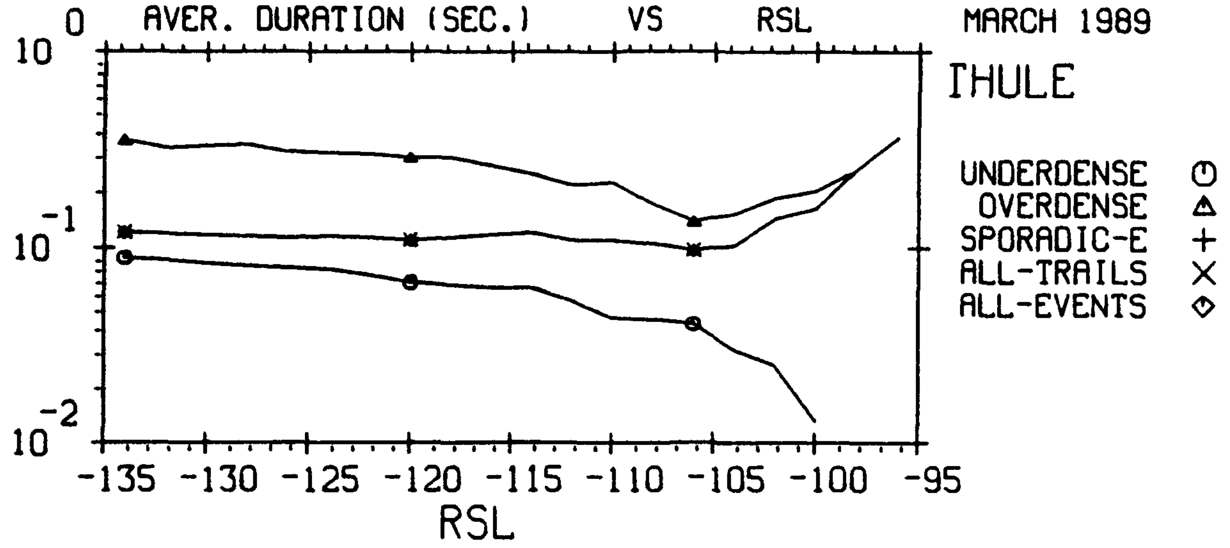
MENU=106,06-1
24-SEP-90
PLOT= 91.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ

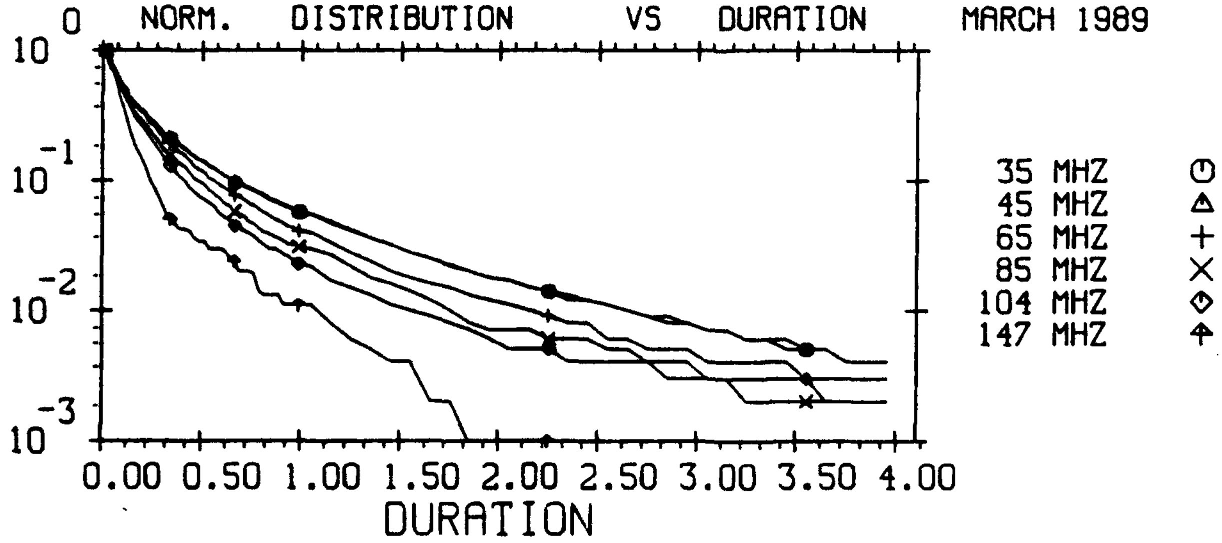
MENU=106,06-1
24-SEP-90
PLOT= 92.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY = 147 MHZ

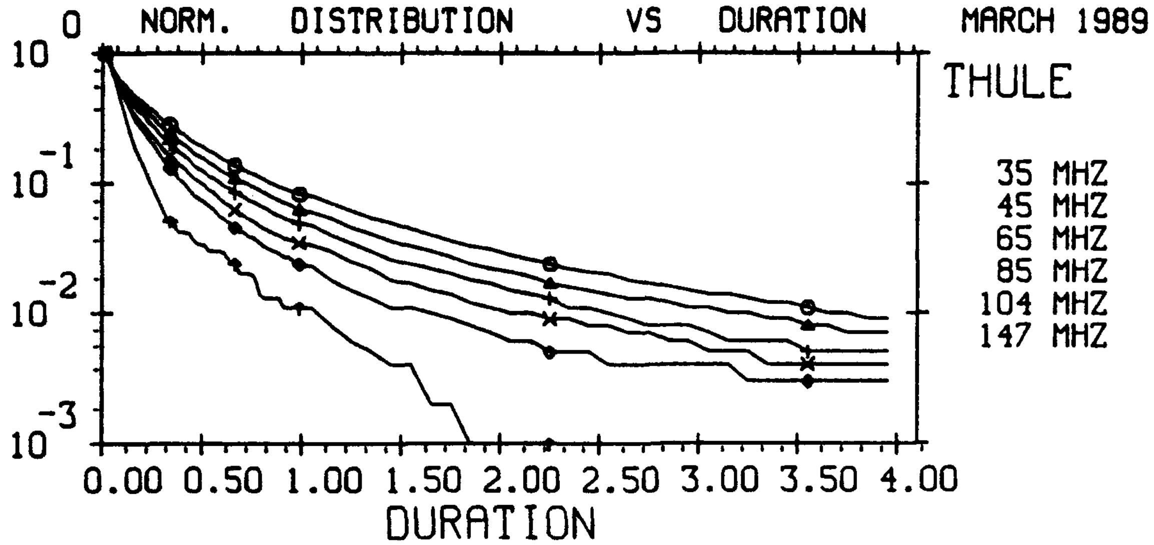
MENU=106,06-1
24-SEP-90
PLOT= 93.00




EXCEEDING 19.0 DB SNR
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH = 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL
NORMALIZING FACTORS:
35MHZ - 52718. 45MHZ - 26365. 65MHZ - 7396.
85MHZ - 4722. 104MHZ - 4776. 147MHZ - 835.

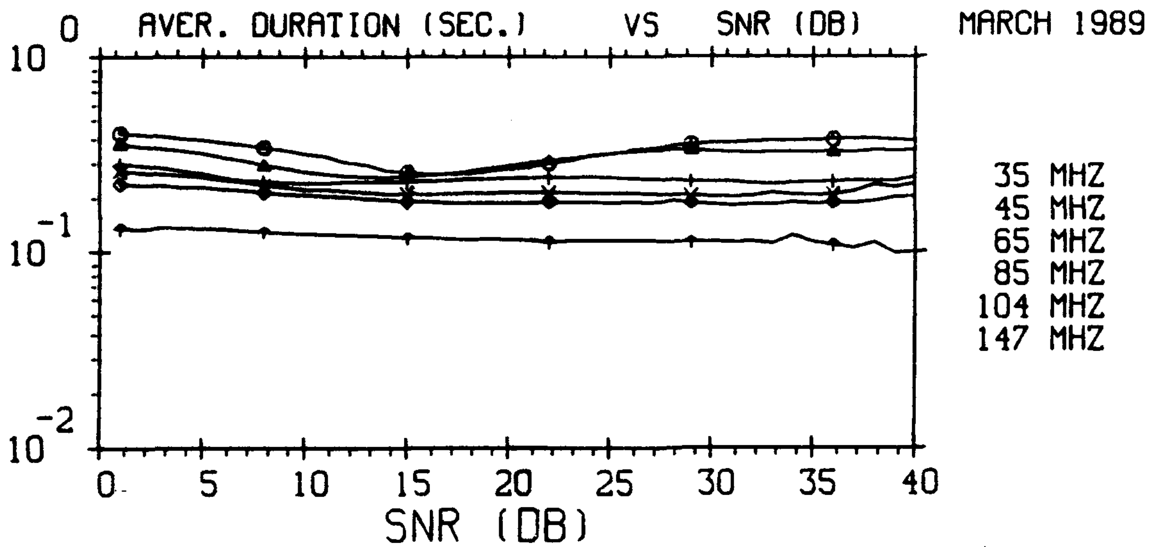
MENU=107,01-4
24-SEP-90
PLOT= 94.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING 19.0 DB SNR
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH = 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL
NORMALIZING FACTORS:
35MHZ - 93390. 45MHZ - 35327. 65MHZ - 7864.
85MHZ - 5462. 104MHZ - 4784. 147MHZ - 835.

MENU=107,01-4
24-SEP-90
PLOT= 95.00

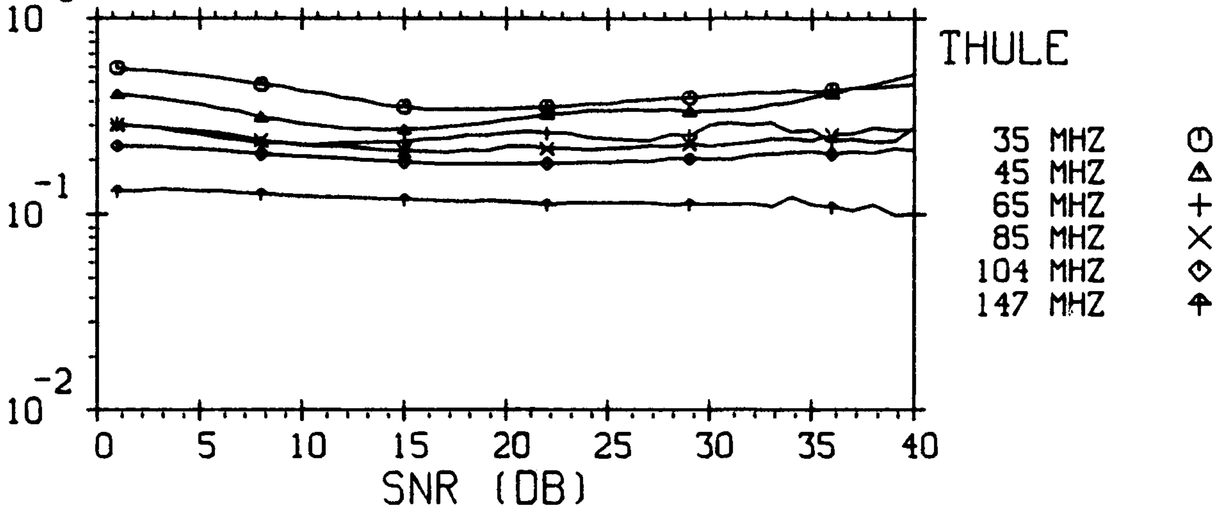



THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH = 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

MENU=107,05-1
24-SEP-90
PLOT= 96.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

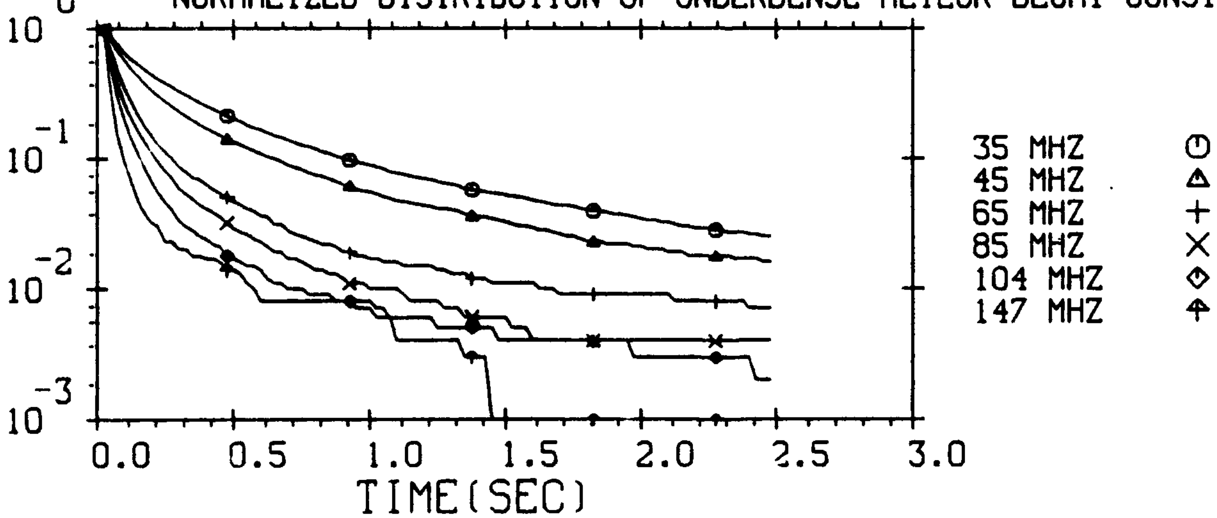
AVER. DURATION (SEC.) VS SNR (DB) MARCH 1989




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

MENU=107,05-1
24-SEP-90
PLOT= 97.00

NORMALIZED DISTRIBUTION OF UNDERDENSE METEOR DECAY CONSTANTS

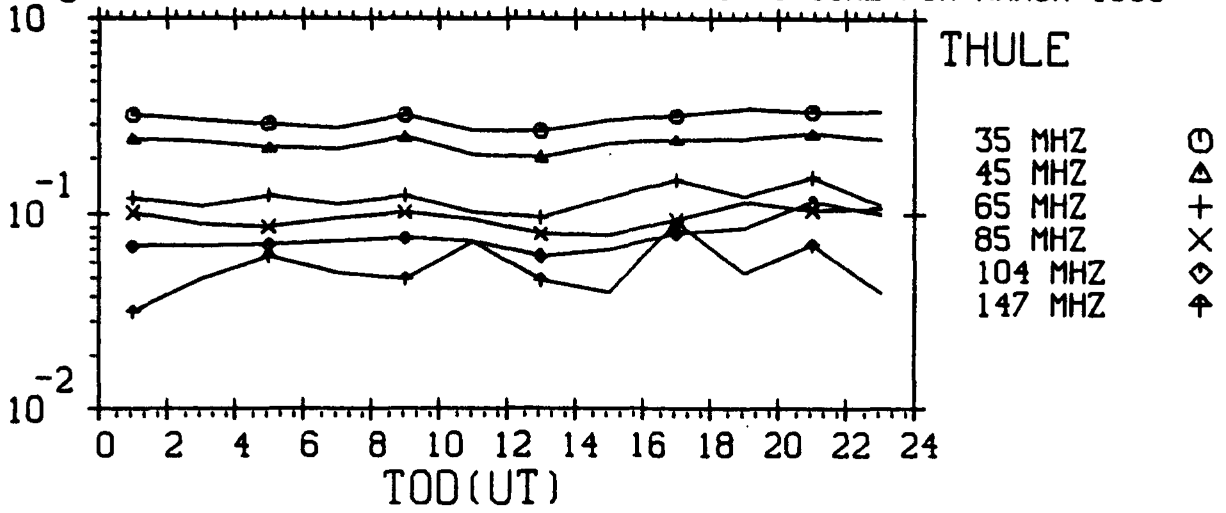



MARCH 1989
THE TIME OF DAY IS 0 : 24 HOURS U.T.
NORMALIZING FACTORS:
35MHZ : 16824. 45MHZ : 13689. 65MHZ : 6467.
85MHZ : 3928. 104MHZ : 3913. 147MHZ : 708.

MENU=108,01-4
24-SEP-90
PLOT= 98.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM

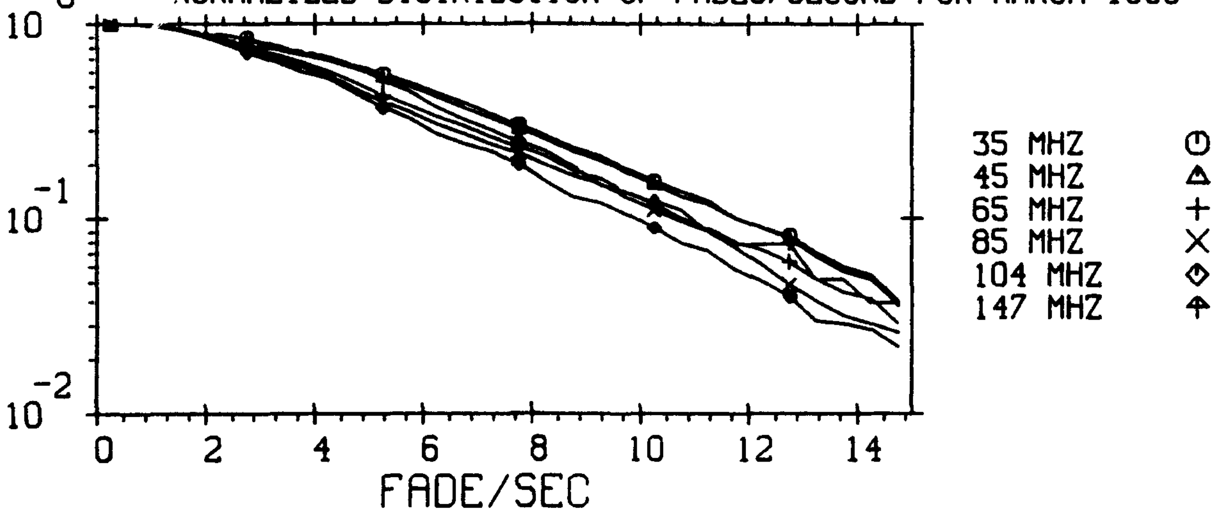
AVERAGE UNDERDENSE TIME CONSTANT VS TIME FOR MARCH 1989




THE 24 HOUR AVERAGE TIME CONSTANTS ARE
0.301 0.227 0.119 0.095 0.077 0.054

MENU=108,02-1
24-SEP-90
PLOT= 99.00

NORMALIZED DISTRIBUTION OF FADES/SECOND FOR MARCH 1989

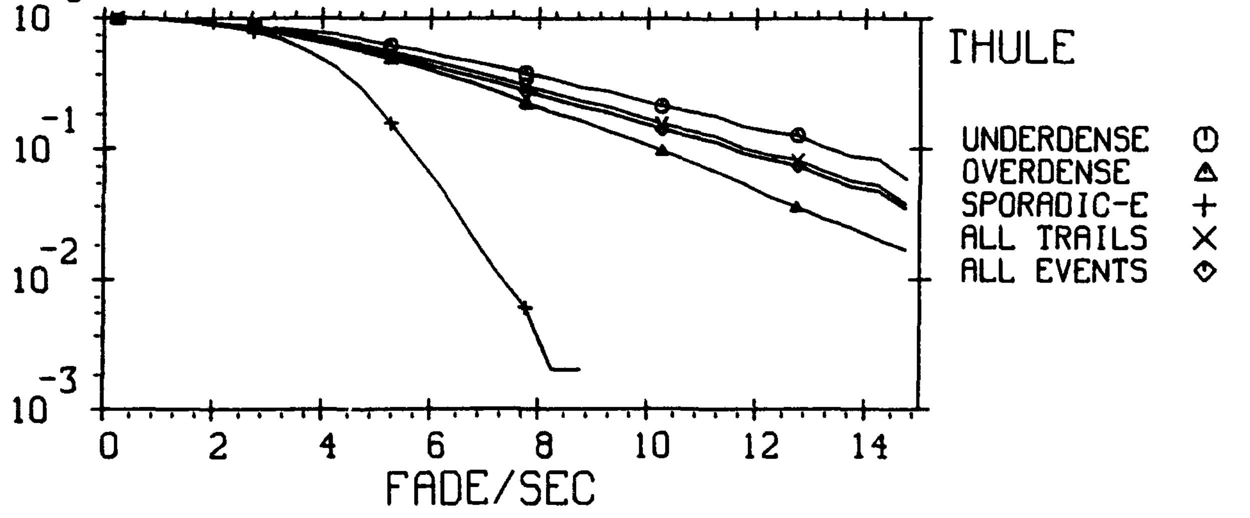



THE TIME OF DAY IS 0 : 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ : 20169. 45MHZ : 12491. 65MHZ : 2595.
85MHZ : 1123. 104MHZ : 769. 147MHZ : 81.

MENU=109,01-4
24-SEP-90
PLOT= 100.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

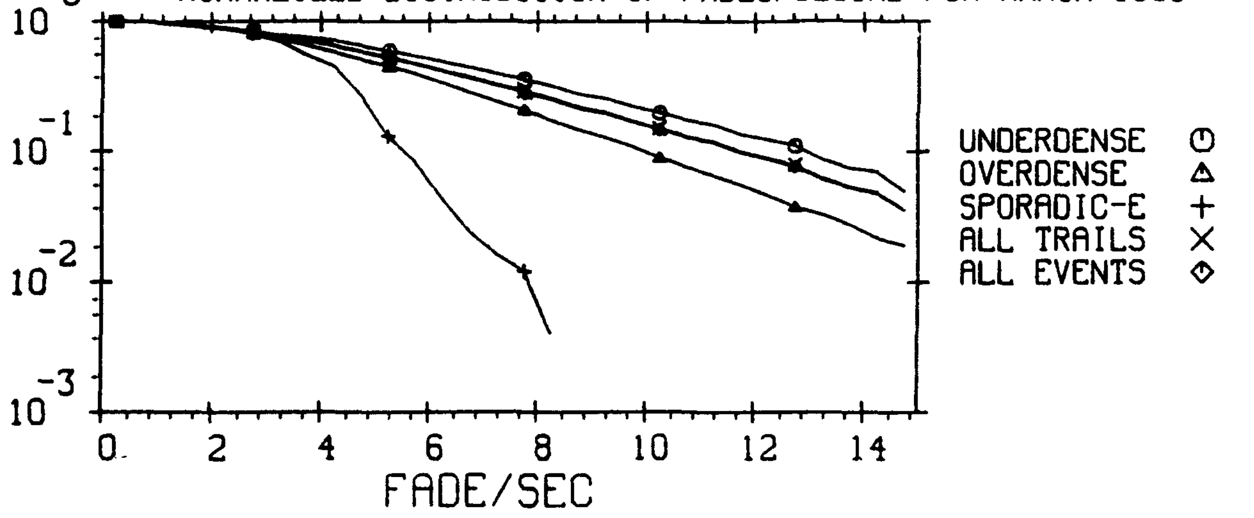
NORMALIZED DISTRIBUTION OF FADES/SECOND FOR MARCH 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER : 10284. OVER : 9885. SPOR-E : 2094.
TRAILS : 20169. EVENTS : 22263.

MENU=109,02-4
24-SEP-90
PLOT= 101.00

NORMALIZED DISTRIBUTION OF FADES/SECOND FOR MARCH 1989

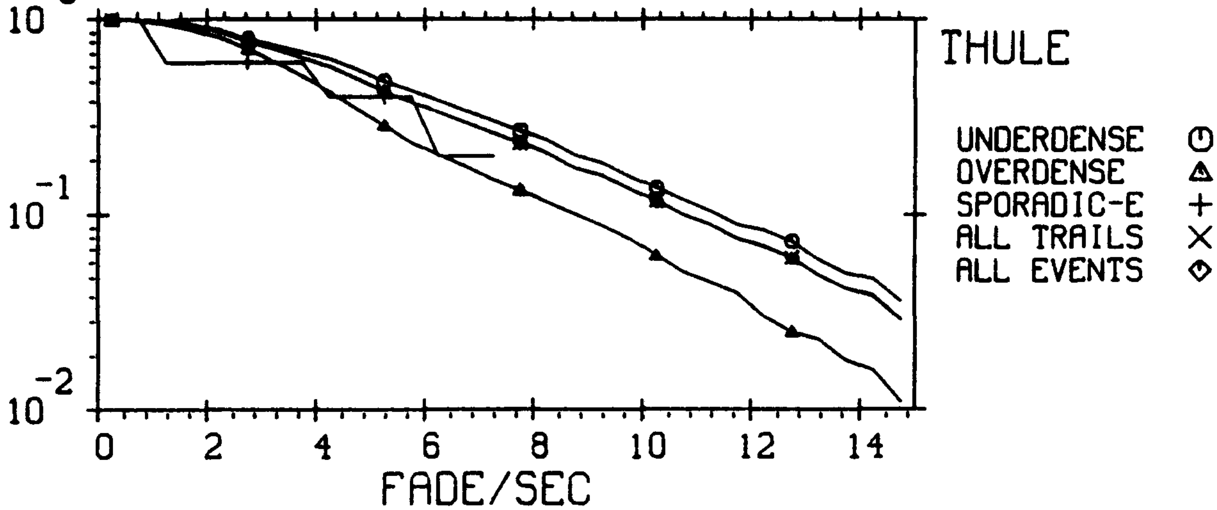



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER : 7025. OVER : 5466. SPOR-E : 253.
TRAILS : 12491. EVENTS : 12744.

MENU=109,02-4
24-SEP-90
PLOT= 102.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

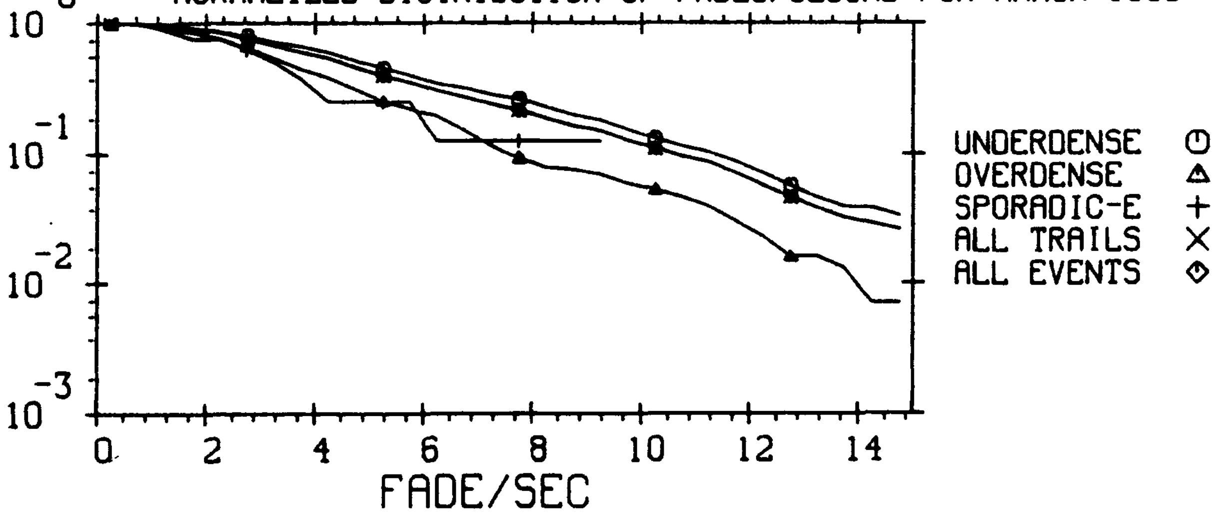
NORMALIZED DISTRIBUTION OF FADES/SECOND FOR MARCH 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER : 1889. OVER : 706. SPOR-E : 5.
TRAILS : 2595. EVENTS : 2600.

MENU=109,02-4
24-SEP-90
PLOT= 103.00

NORMALIZED DISTRIBUTION OF FADES/SECOND FOR MARCH 1989

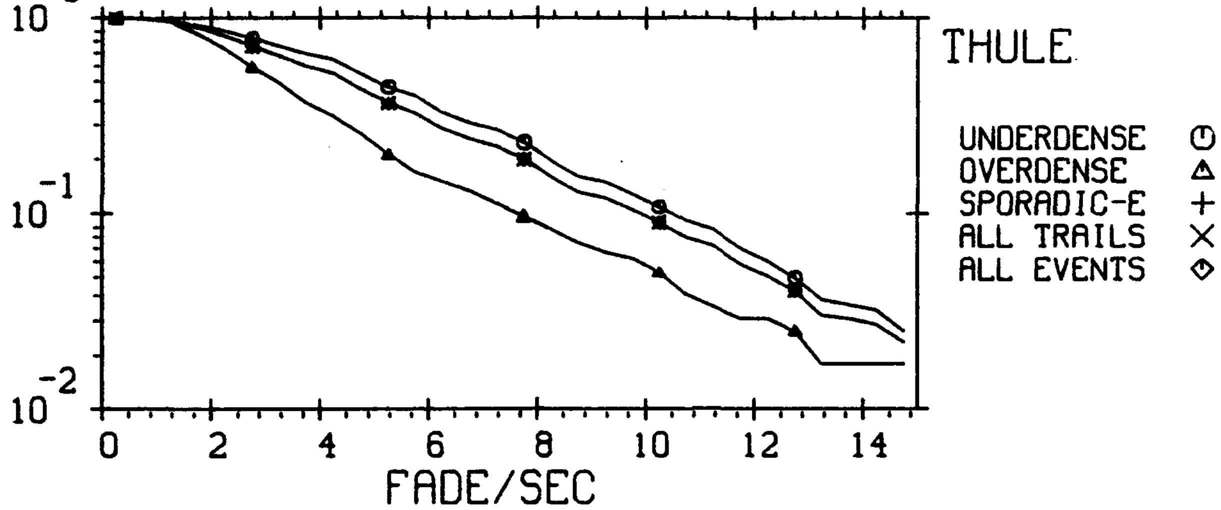



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER : 819. OVER : 304. SPOR-E : 8.
TRAILS : 1123. EVENTS : 1131.

MENU=109,02-4
24-SEP-90
PLOT= 104.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

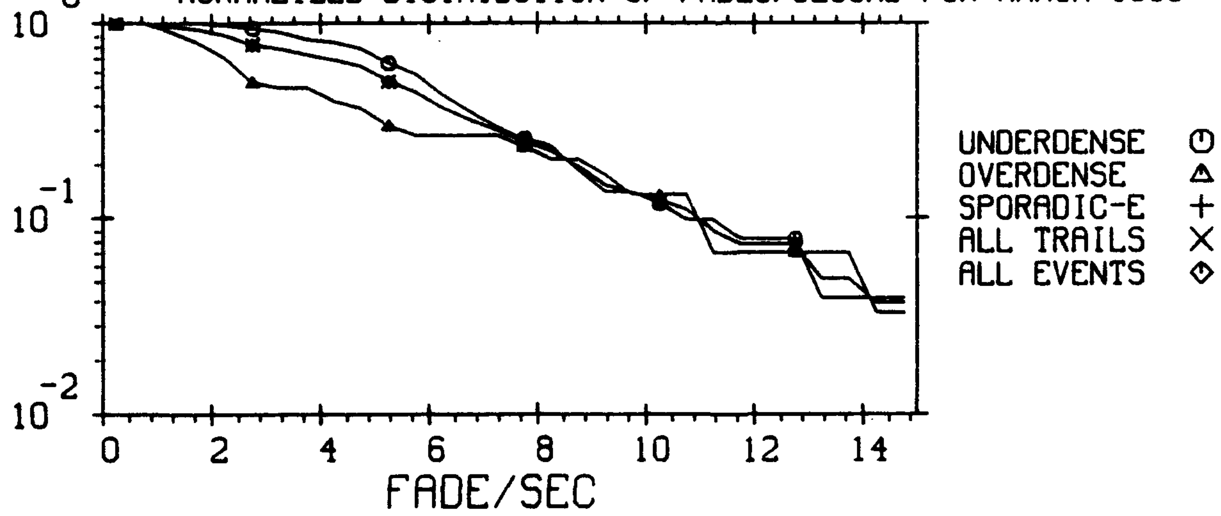
NORMALIZED DISTRIBUTION OF FADES/SECOND FOR MARCH 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER : 530. OVER : 239. SPOR-E : 1.
TRAILS : 769. EVENTS : 769.

MENU=109,02-4
24-SEP-90
PLOT= 105.00

NORMALIZED DISTRIBUTION OF FADES/SECOND FOR MARCH 1989

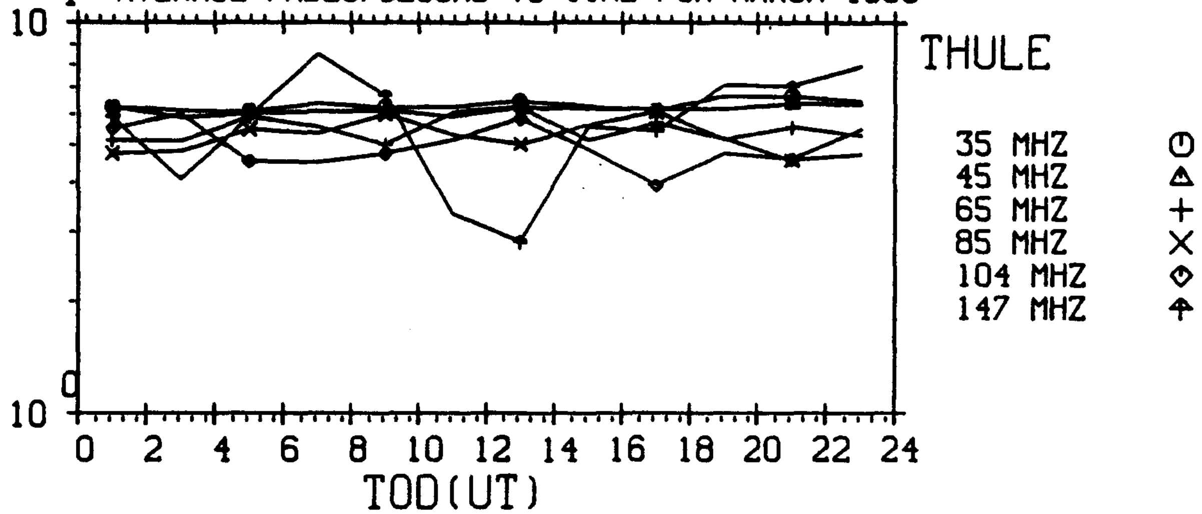



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER : 51. OVER : 30. SPOR-E : 1.
TRAILS : 81. EVENTS : 81.

MENU=109,02-4
24-SEP-90
PLOT= 106.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM

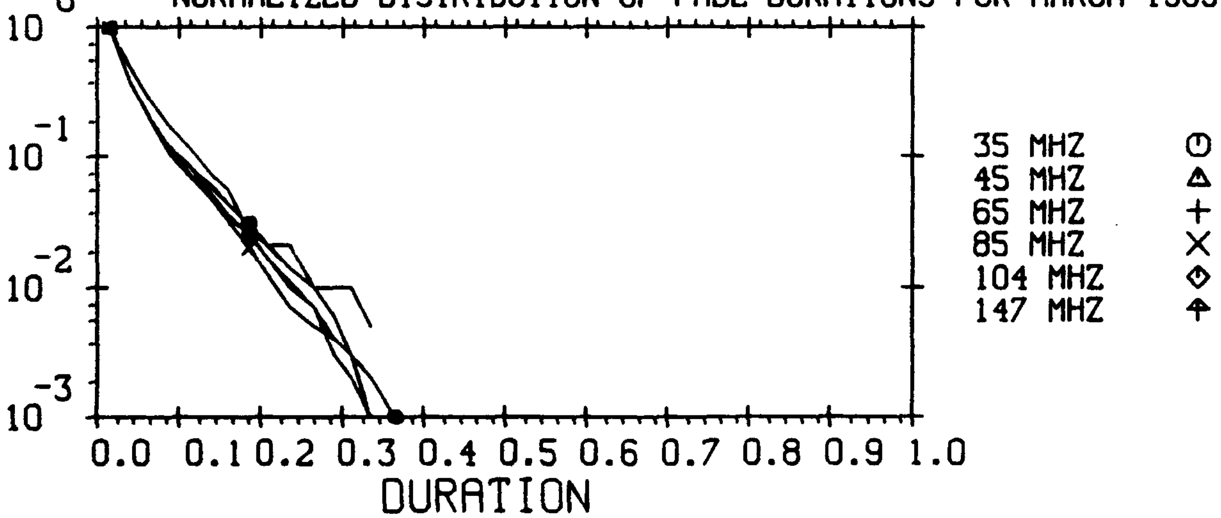
AVERAGE FADES/SECOND VS TIME FOR MARCH 1989




THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
THE 24 HOUR FADES/SECOND AVERAGES ARE:
6.137 5.966 5.341 5.114 4.814 5.651

MENU=109,07-1
24-SEP-90
PLOT= 107.00

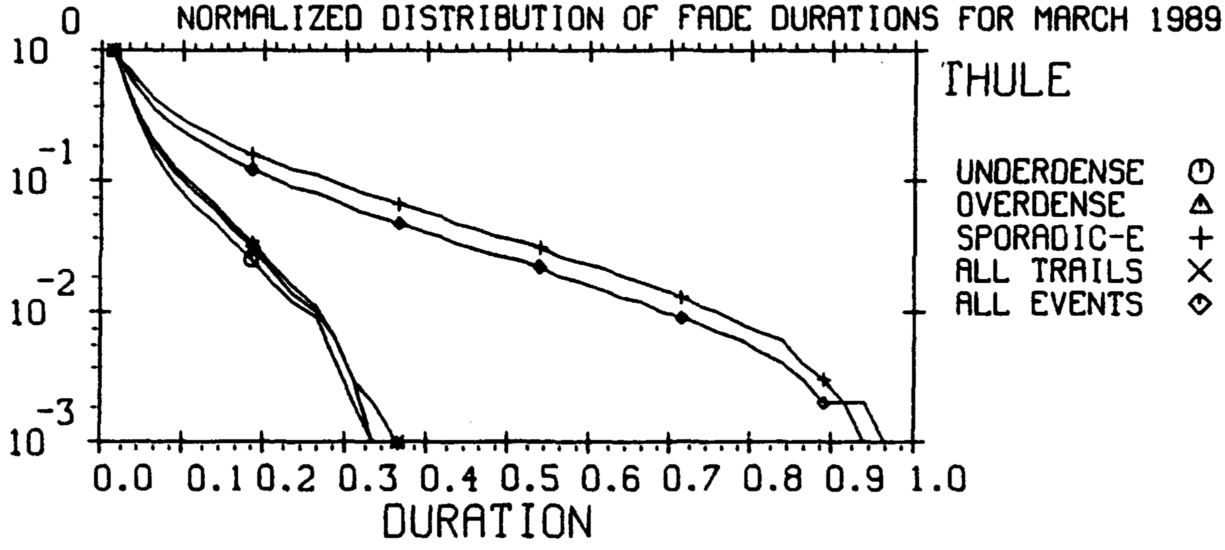
NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR MARCH 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ : 90638. 45MHZ : 52300. 65MHZ : 8343.
85MHZ : 3355. 104MHZ : 2305. 147MHZ : 195.

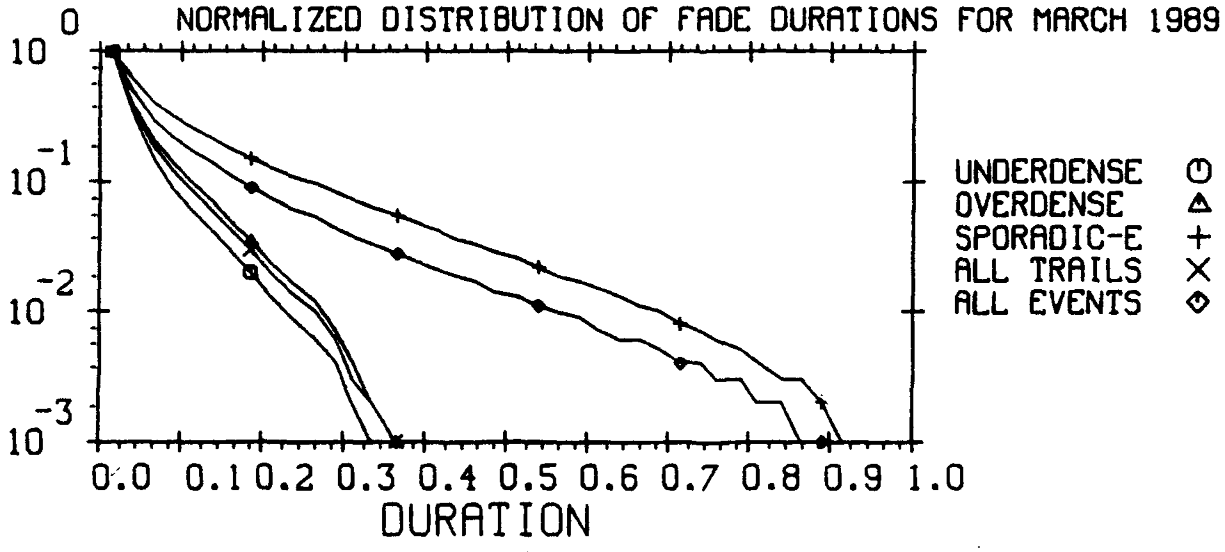
MENU=109,05-4
24-SEP-90
PLOT= 108.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER : 30681. OVER : 59957. SPOR-E : 215104.
TRAILS : 90638. EVENTS : 305742.

MENU=109,06-4
24-SEP-90
PLOT= 109.00

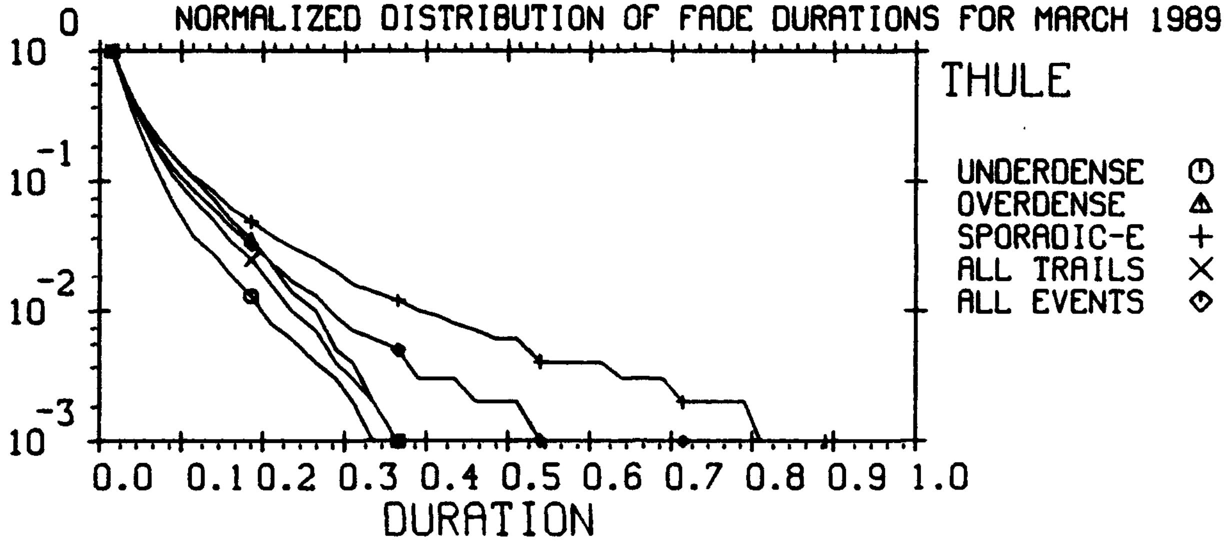



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER : 19301. OVER : 32999. SPOR-E : 52878.
TRAILS : 52300. EVENTS : 105178.

MENU=109,06-4
24-SEP-90
PLOT= 110.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM

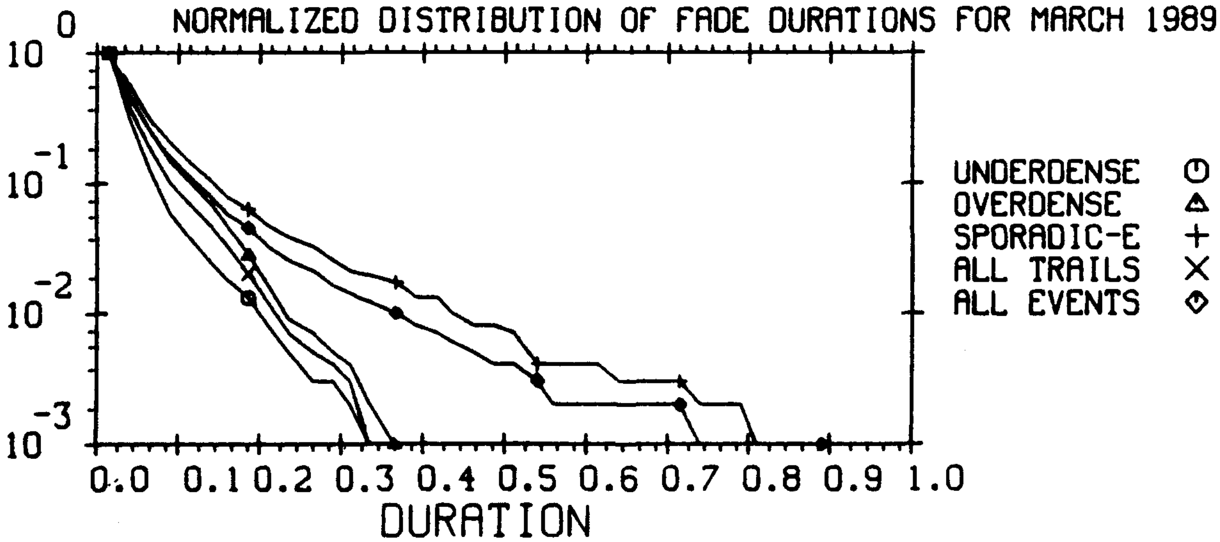
NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR MARCH 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER : 4174. OVER : 4169. SPOR-E : 4189.
TRAILS : 8343. EVENTS : 12532.

MENU=109,06-4
24-SEP-90
PLOT= 111.00

NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR MARCH 1989

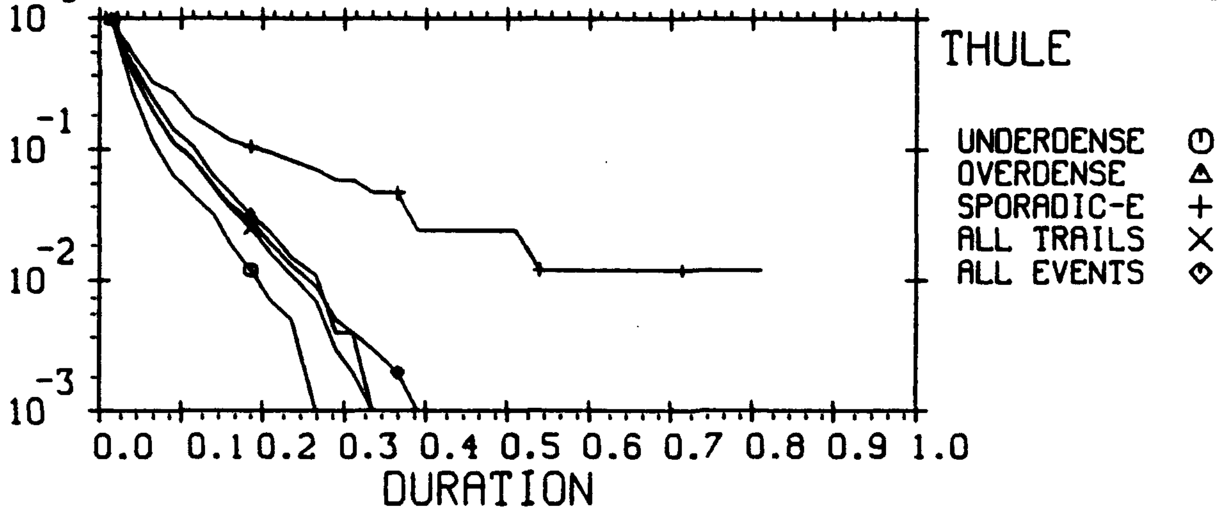



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER : 1734. OVER : 1621. SPOR-E : 4477.
TRAILS : 3355. EVENTS : 7832.

MENU=109,06-4
24-SEP-90
PLOT= 112.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM

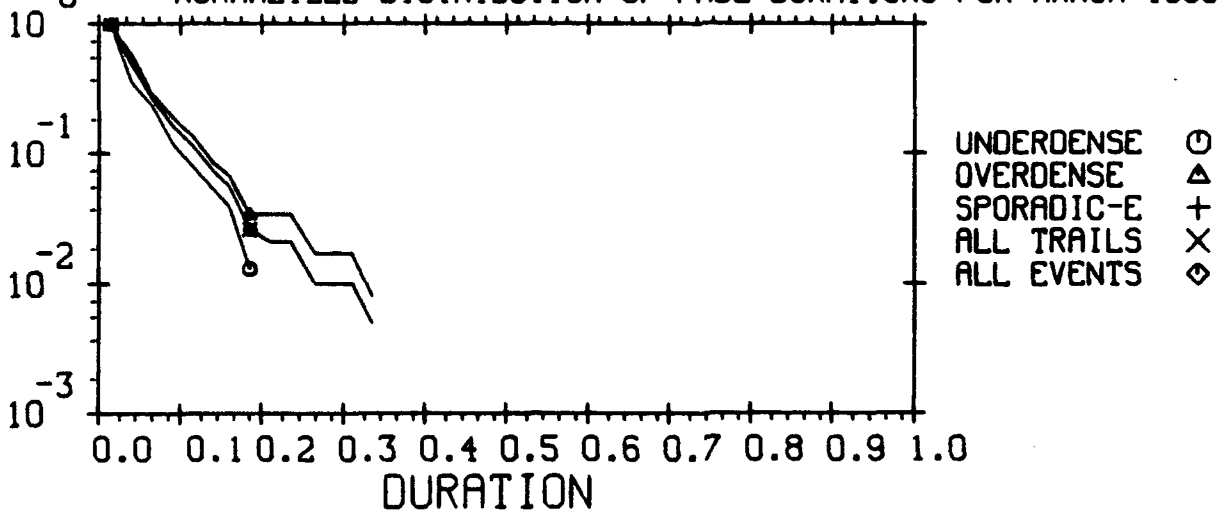
NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR MARCH 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER : 888. OVER : 1417. SPOR-E : 85.
TRAILS : 2305. EVENTS : 2390.

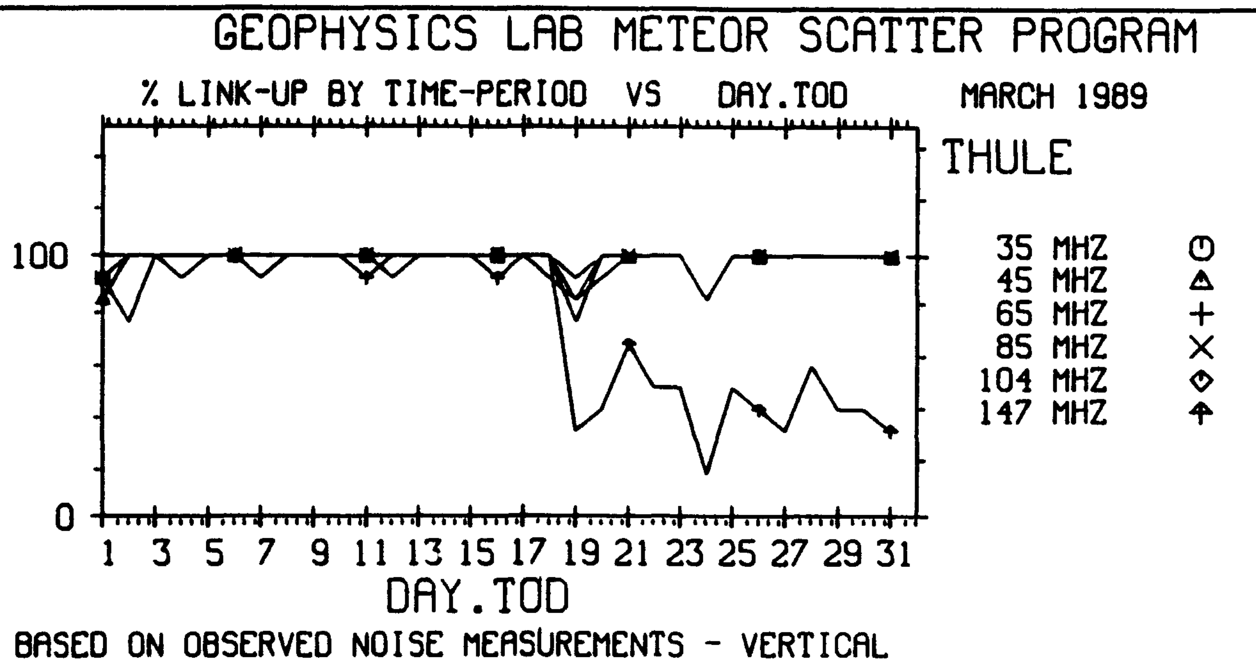
MENU=109,06-4
24-SEP-90
PLOT= 113.00

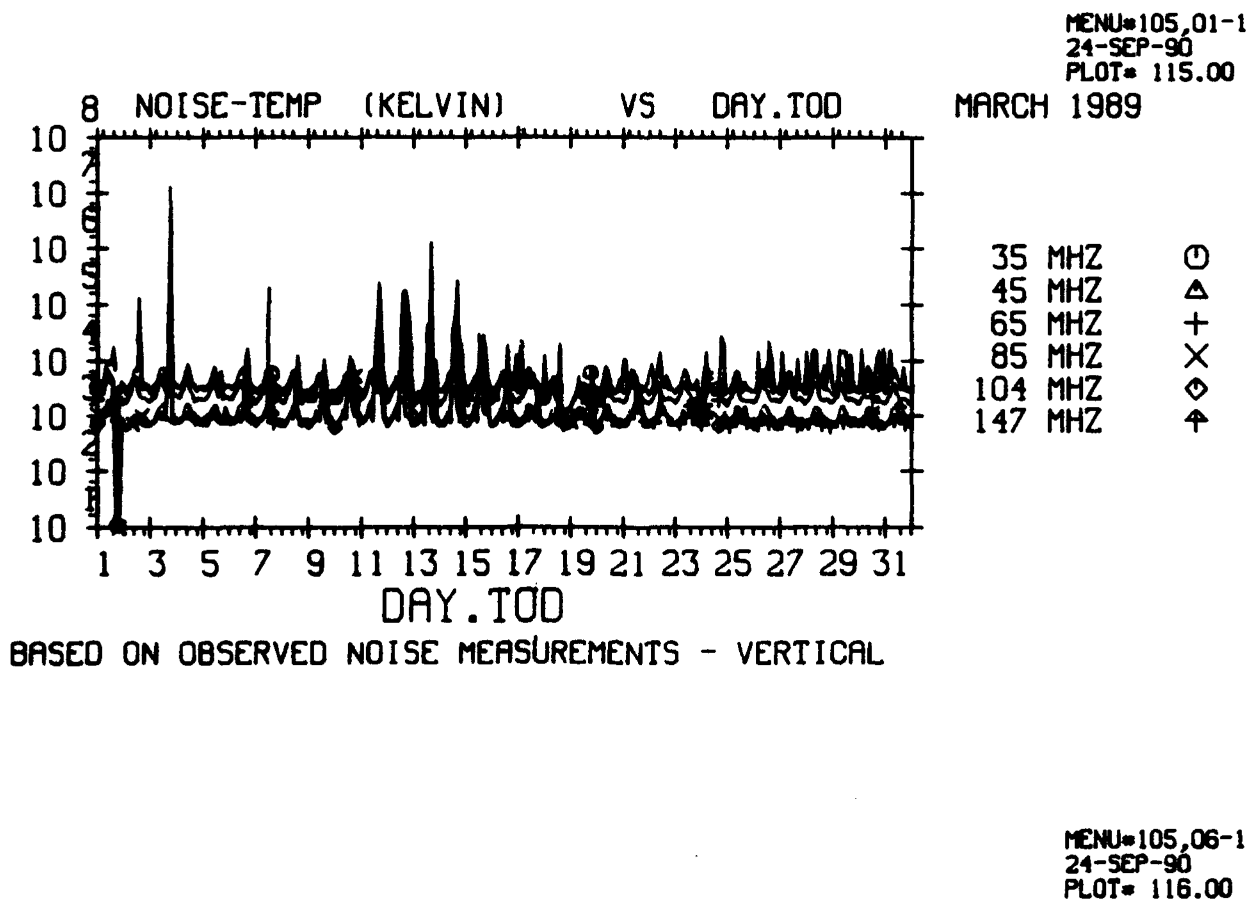
NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR MARCH 1989

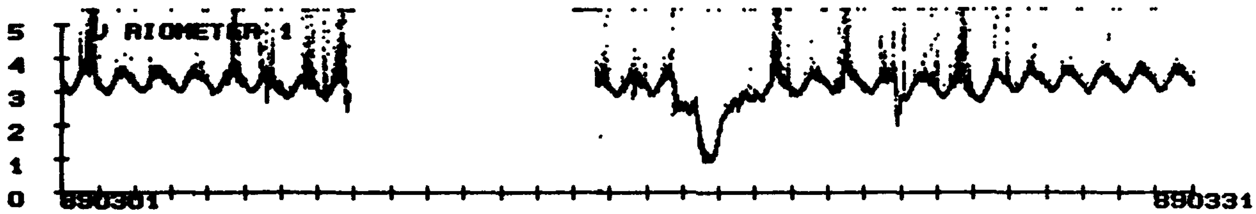



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER : 76. OVER : 119. SPOR-E : 1.
TRAILS : 195. EVENTS : 195.

MENU=109,06-4
24-SEP-90
PLOT= 114.00

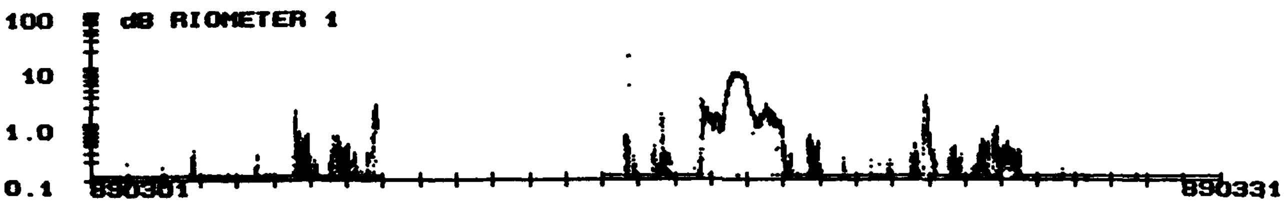

GEOPHYSICS LAB METEOR SCATTER PROGRAM
% LINK-UP BY TIME-PERIOD VS DAY.TOD
MARCH 1989
THULE
100
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
DAY.TOD
35 MHZ
45 MHZ
65 MHZ
85 MHZ
104 MHZ
147 MHZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL
MENU=105,01-1
24-SEP-90
PLOT= 115.00


NOISE-TEMP (KELVIN) VS DAY.TOD
MARCH 1989
10 8
10 7
10 6
10 5
10 4
10 3
10 2
10 1
10 0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
DAY.TOD
35 MHZ
45 MHZ
65 MHZ
85 MHZ
104 MHZ
147 MHZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL
MENU=105,06-1
24-SEP-90
PLOT= 116.00



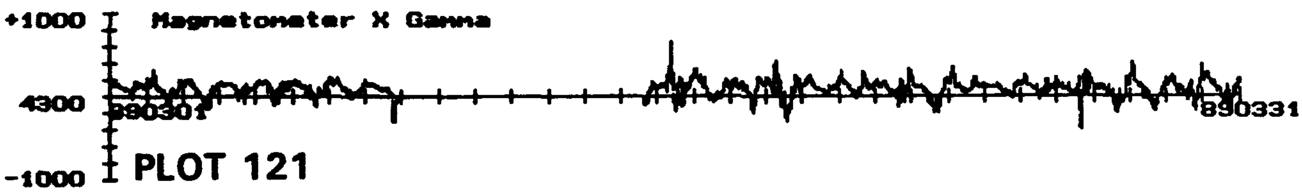

PLOT 117

PLOT 118 RIOMETER 2 DATA UNAVAILABLE

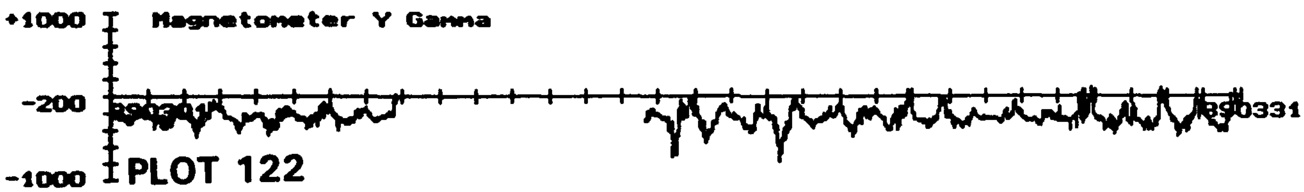



PLOT 119

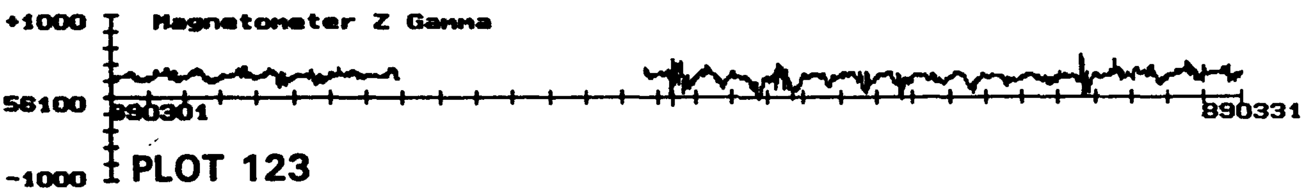
PLOT 120 RIOMETER 2 DATA UNAVAILABLE




PLOT 121




PLOT 122

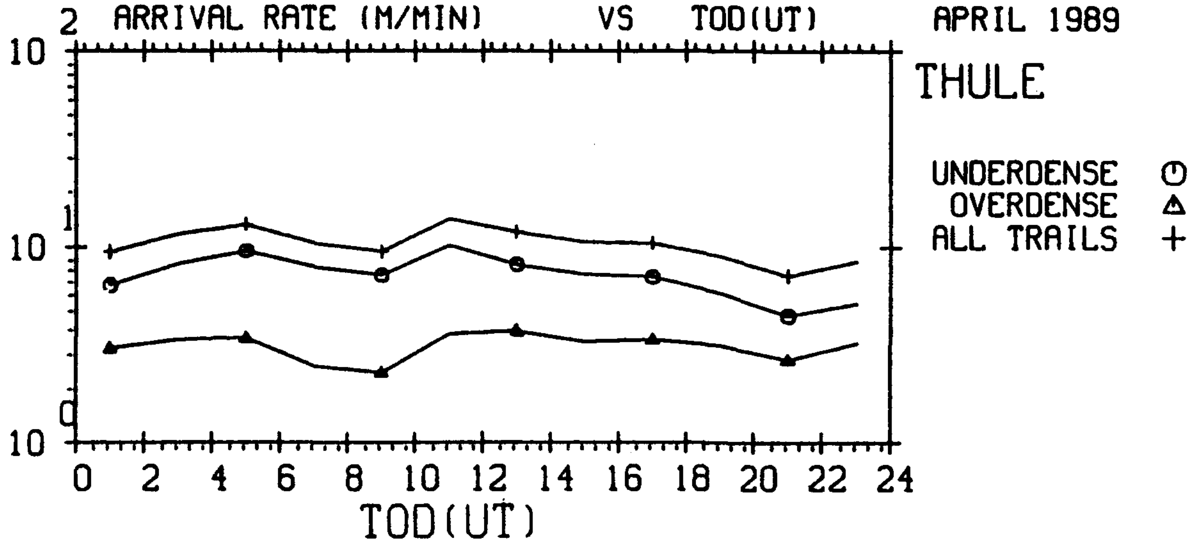



PLOT 123

# APPENDIX C

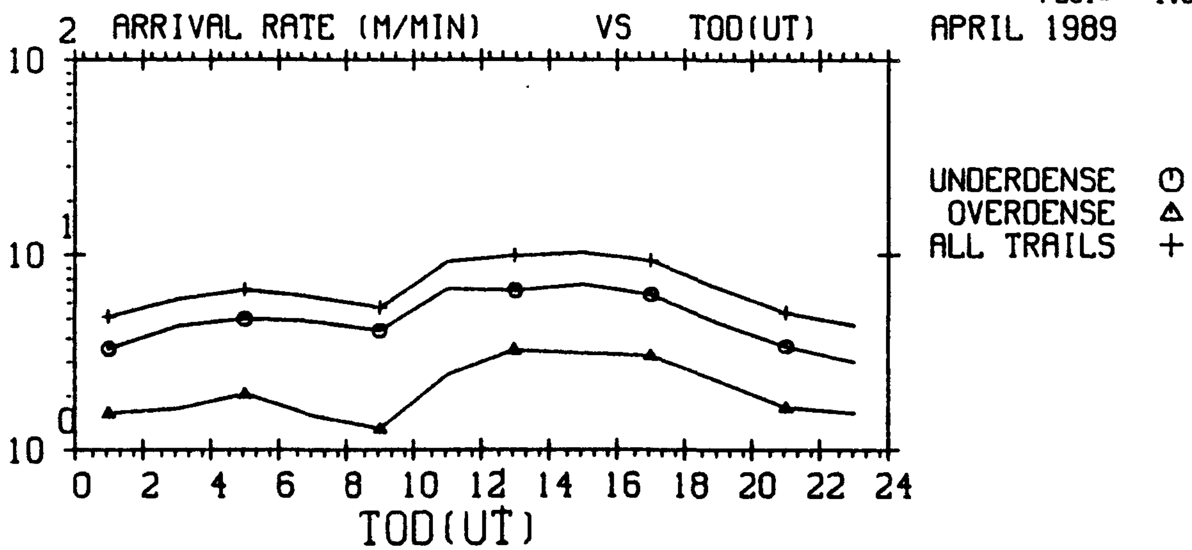
## STATISTICS FOR APRIL 1989

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

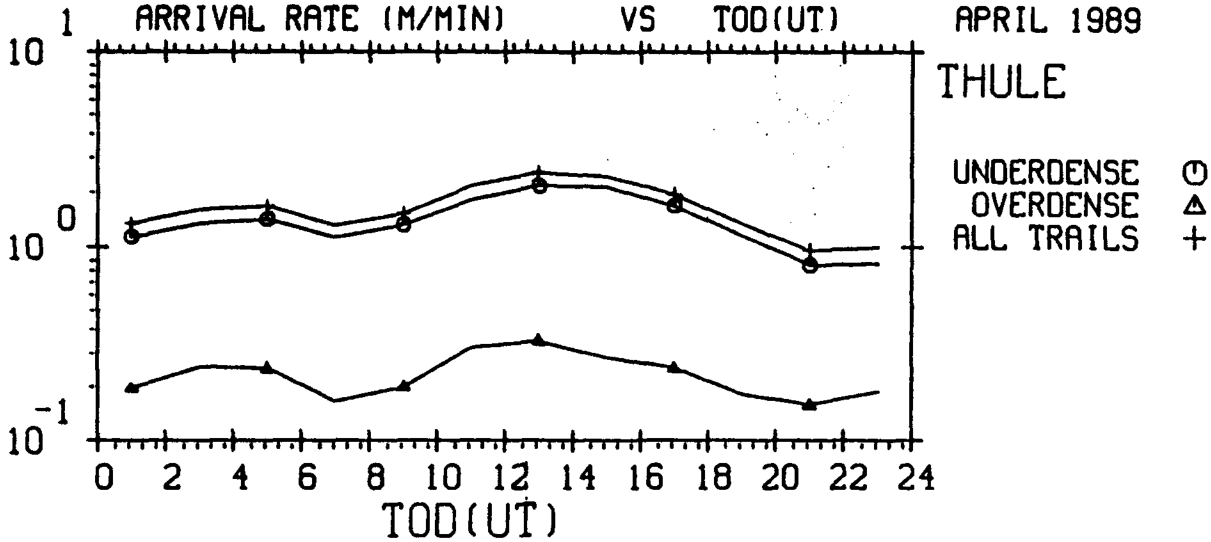
MENU=101,05-2
25-SEP-90
PLOT= 1.00




EXCEEDING -126.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

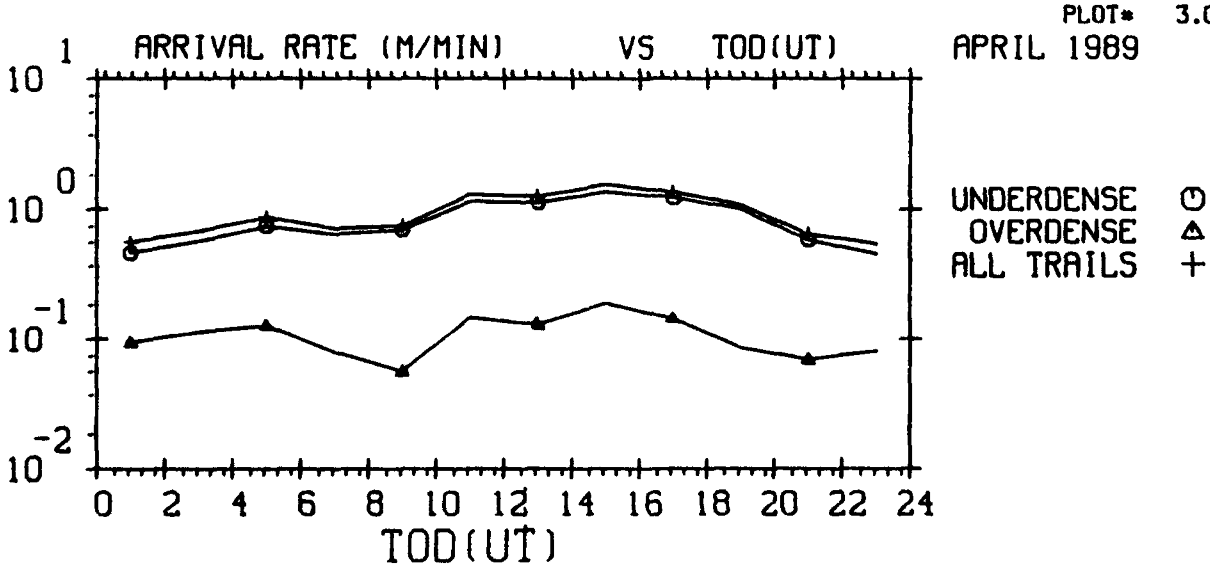
MENU=101,05-2
25-SEP-90
PLOT= 2.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

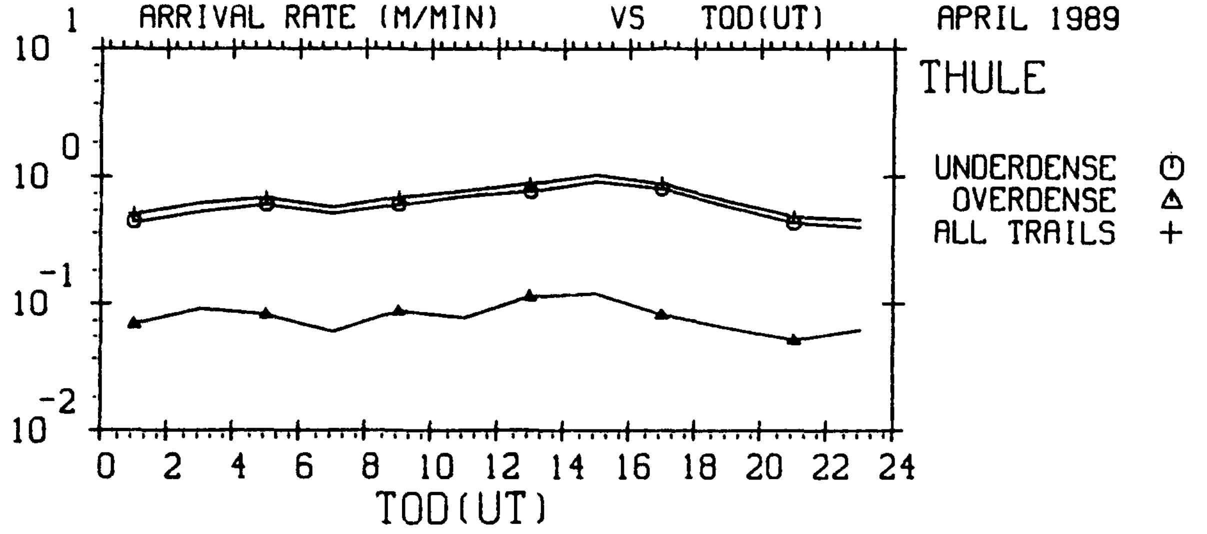
MENU*101,05-2
25-SEP-90
PLOT* 3.00




EXCEEDING -126.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

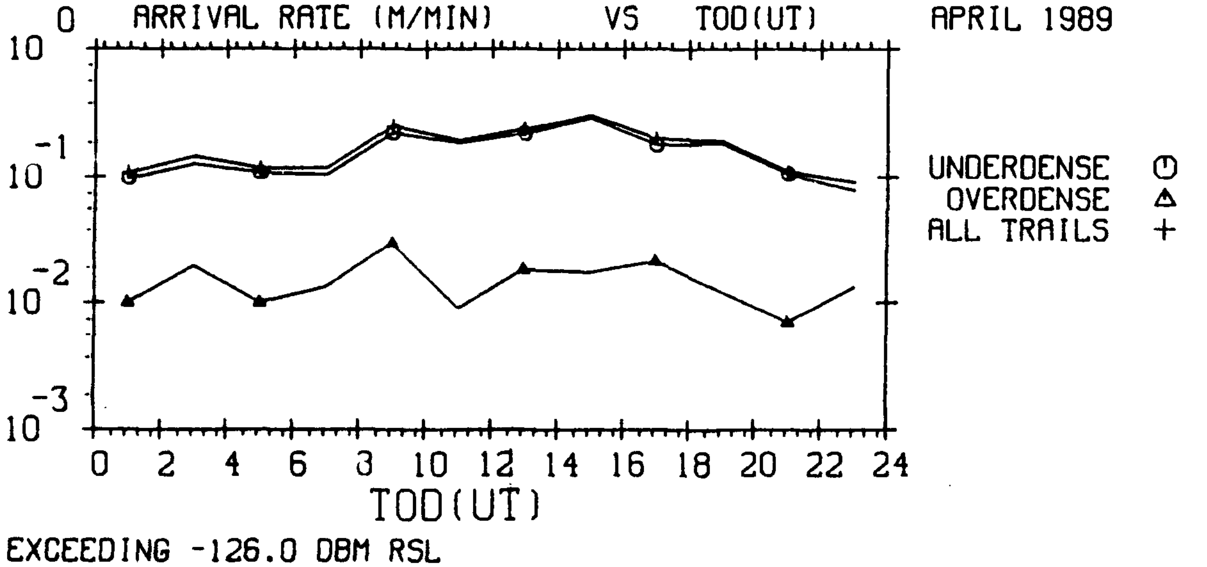
MENU*101,05-2
25-SEP-90
PLOT* 4.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

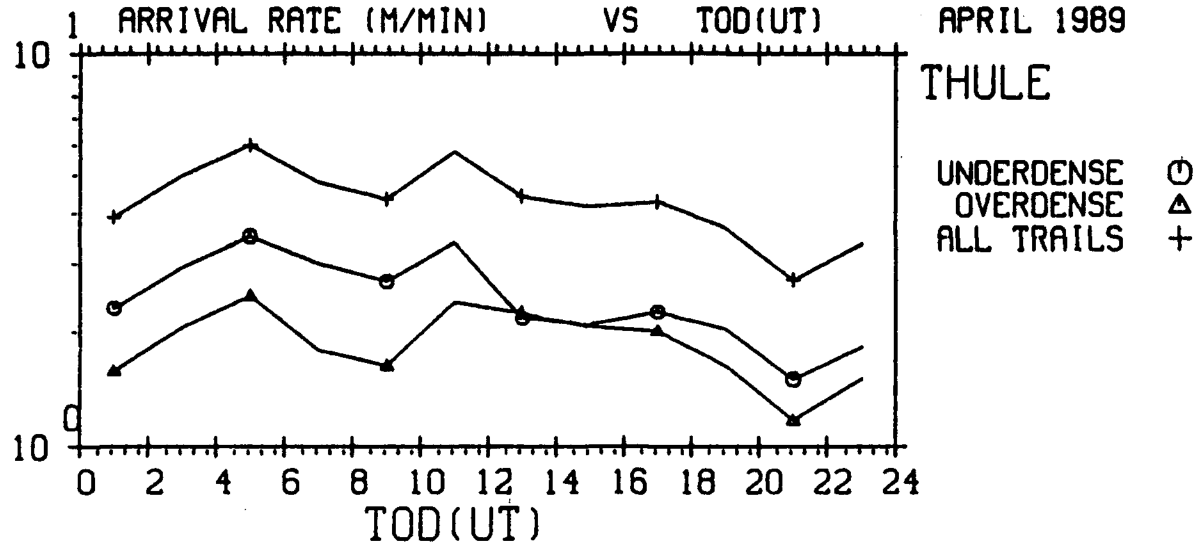
MENU#101,05-2
25-SEP-90
PLOT# 5.00




EXCEEDING -126.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

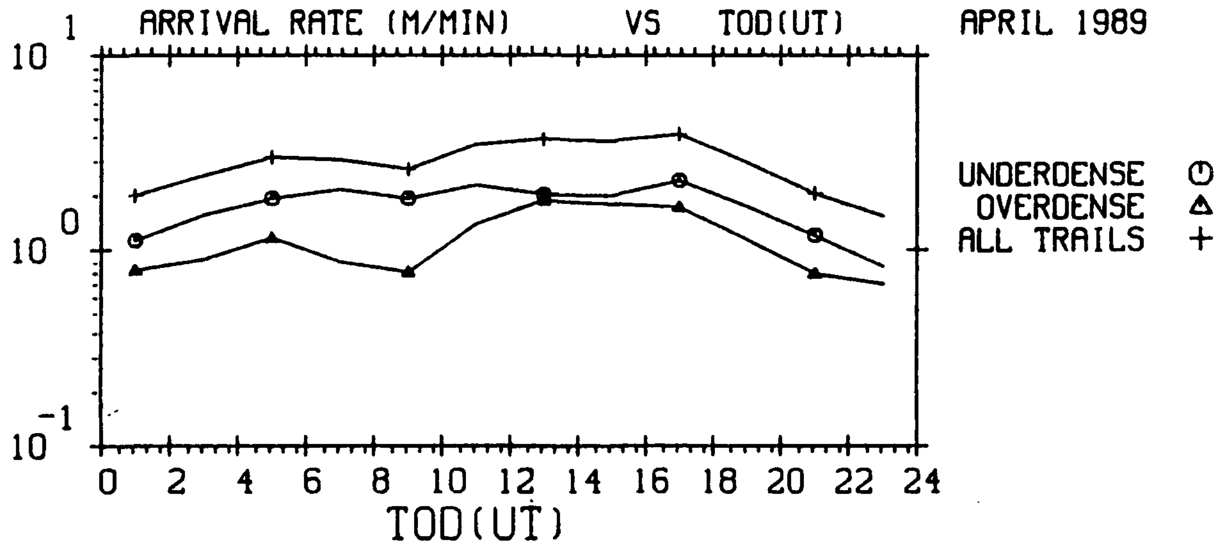
MENU#101,05-2
25-SEP-90
PLOT# 6.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

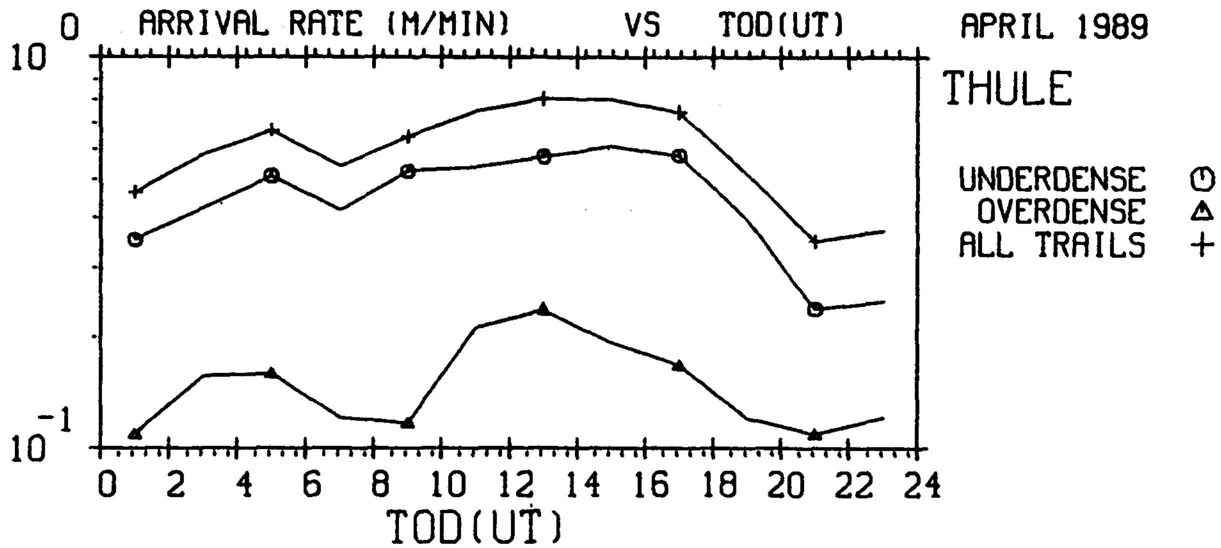
MENU=101,05-2
25-SEP-90
PLOT= 7.00




EXCEEDING -116.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

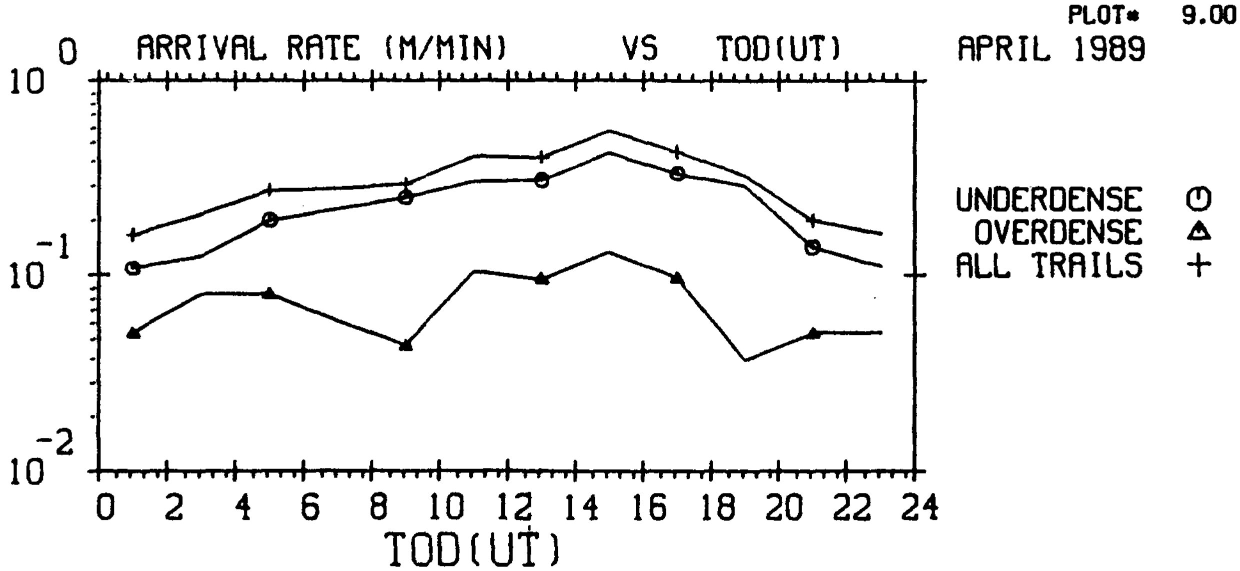
MENU=101,05-2
25-SEP-90
PLOT= 8.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

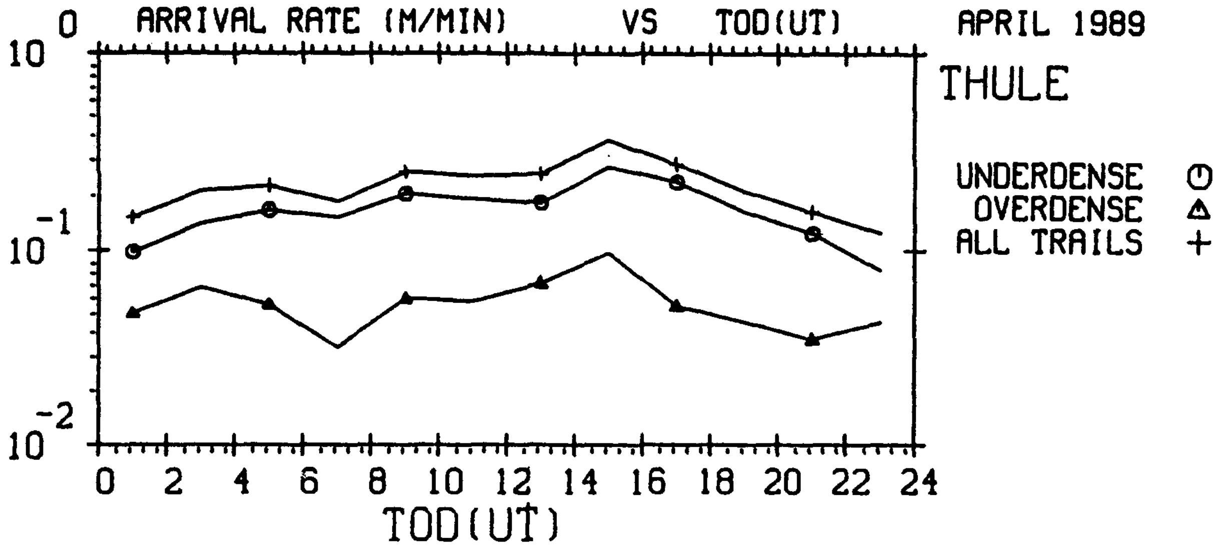
MENU=101,05-2
25-SEP-90
PLOT= 9.00




EXCEEDING -116.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

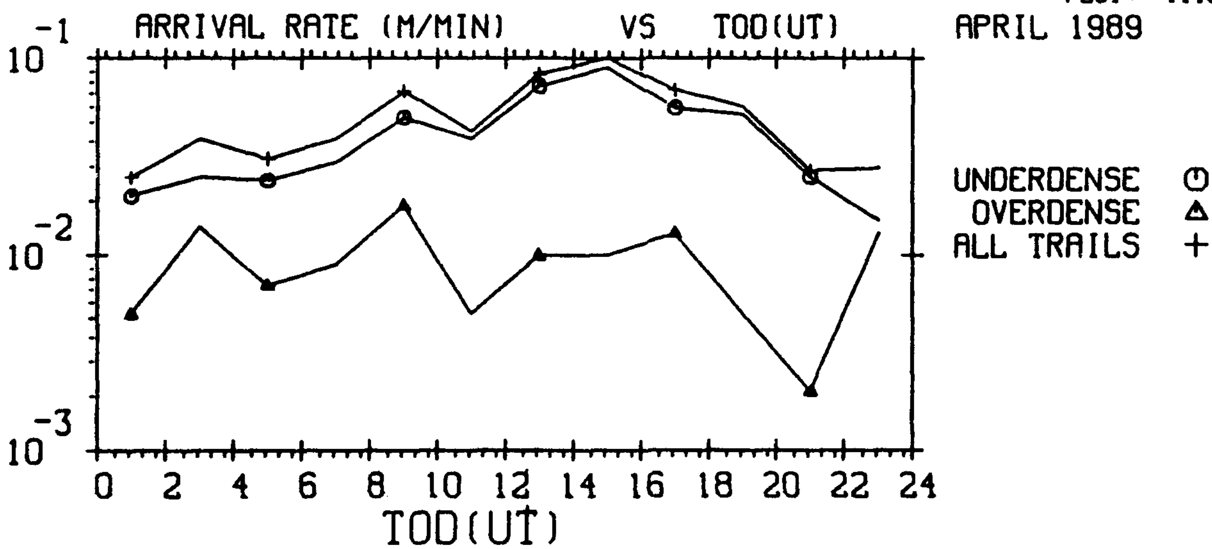
MENU=101,05-2
25-SEP-90
PLOT= 10.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

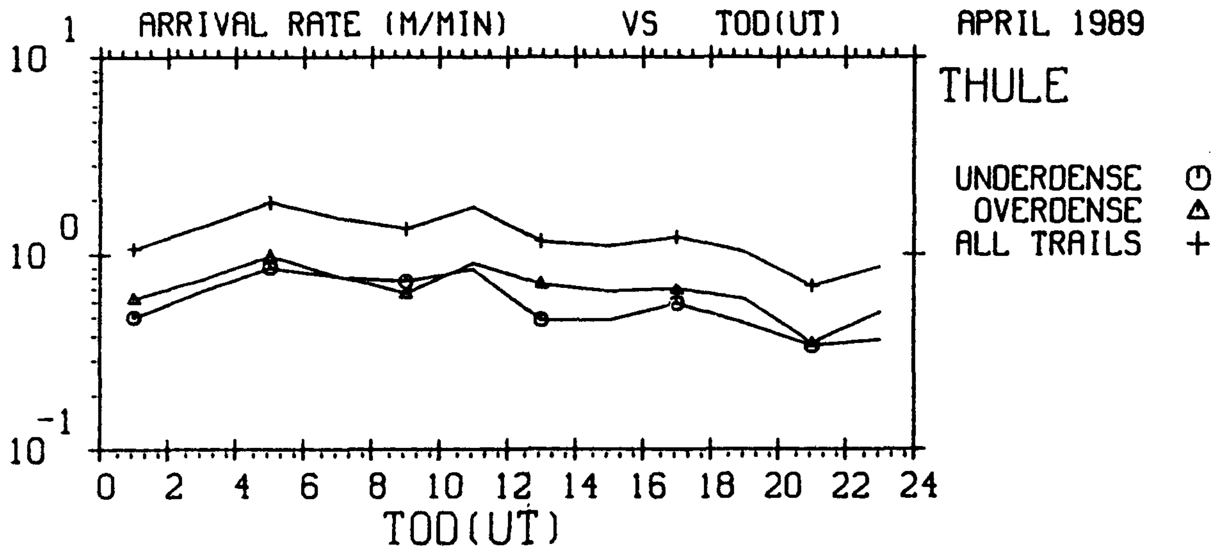
MENU=101,05-2
25-SEP-90
PLOT= 11.00




EXCEEDING -116.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

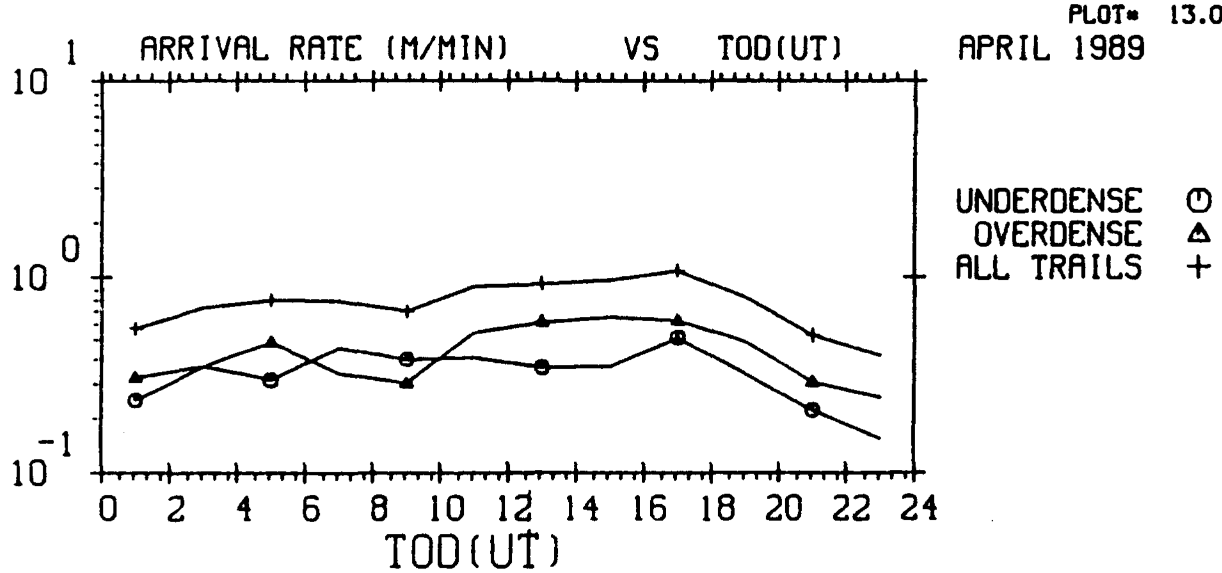
MENU=101,05-2
25-SEP-90
PLOT= 12.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

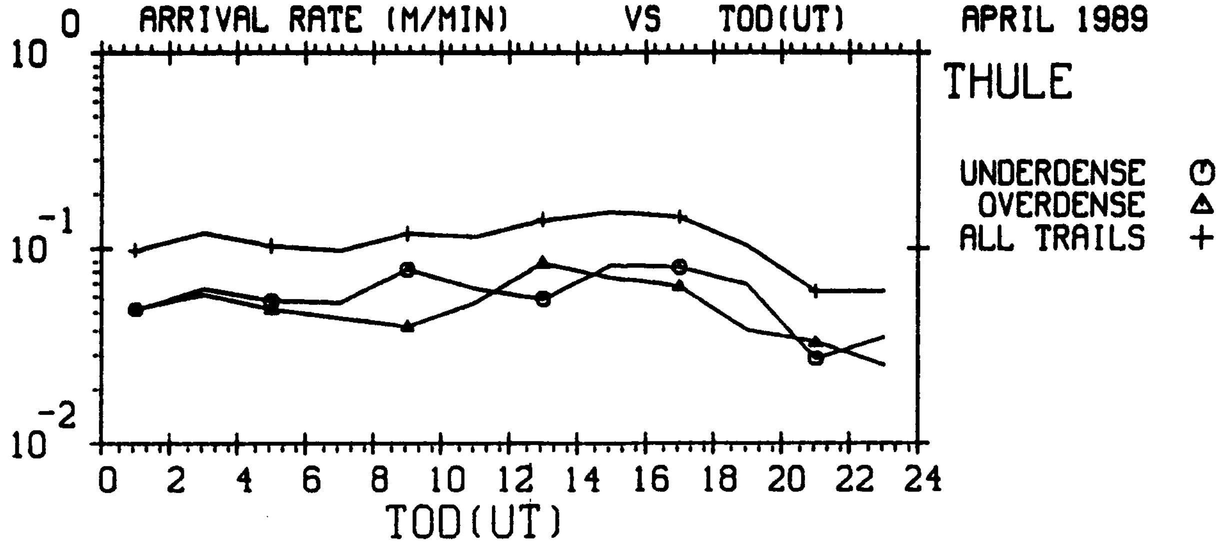
MENU=101,05-2
25-SEP-90
PLOT= 13.00




EXCEEDING -106.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

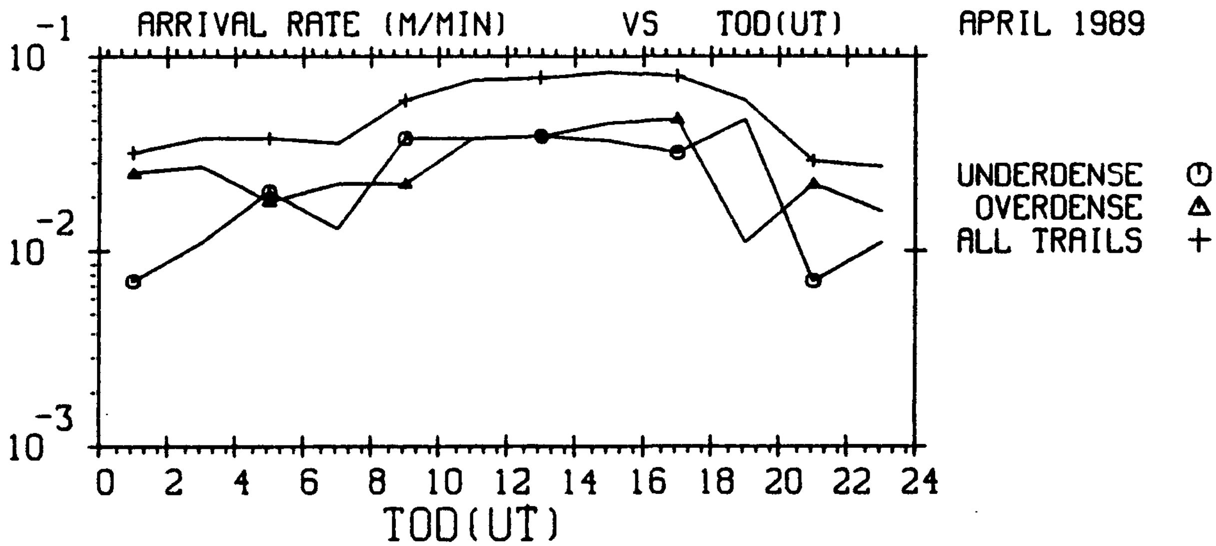
MENU=101,05-2
25-SEP-90
PLOT= 14.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

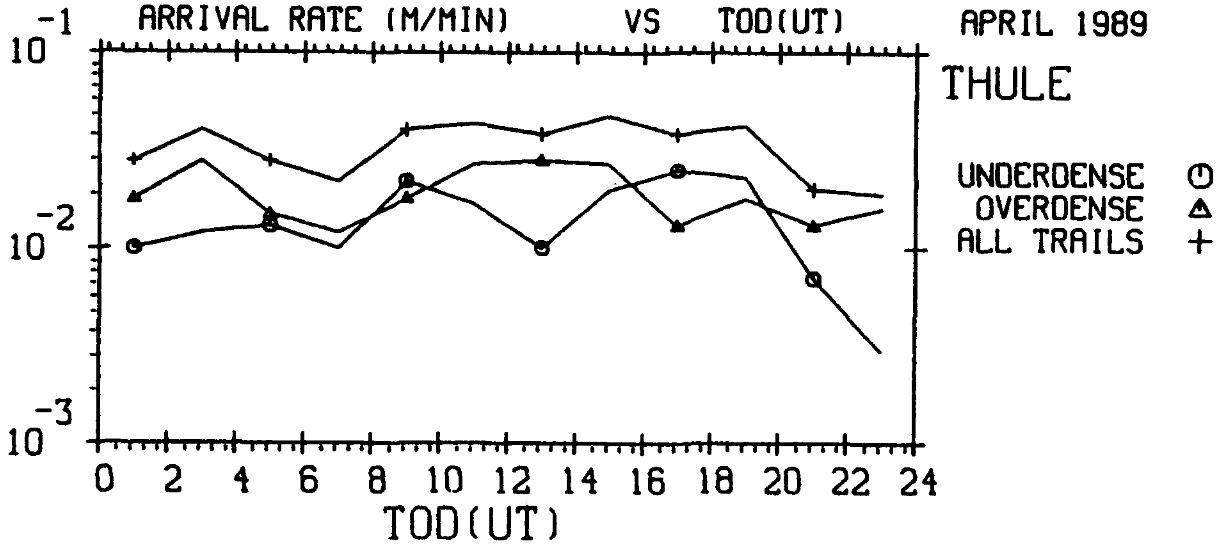
MENU=101,05-2
25-SEP-90
PLOT= 15.00




EXCEEDING -106.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

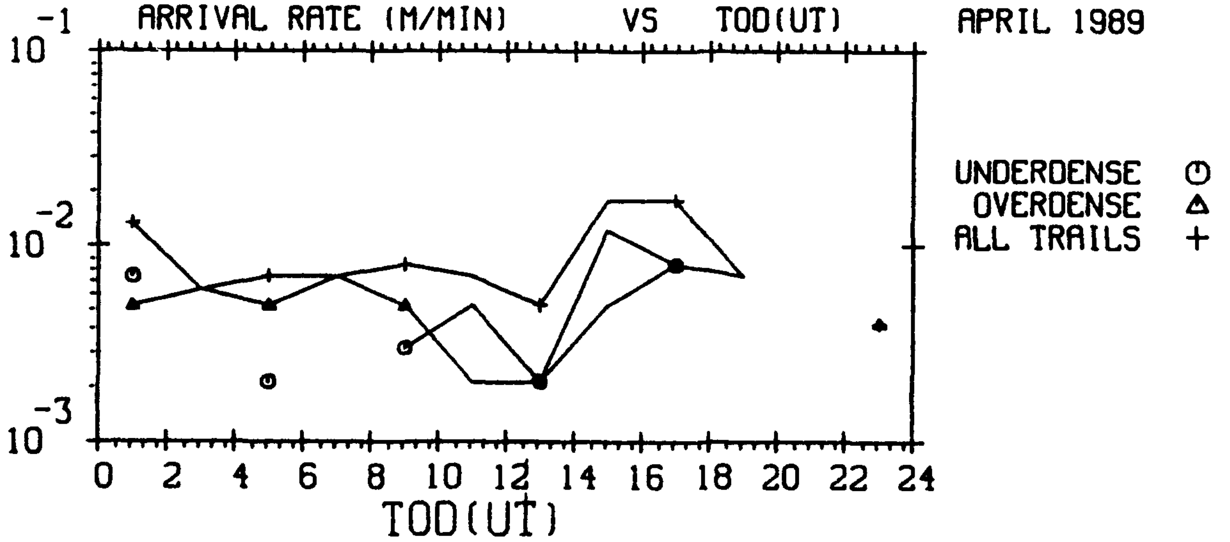
MENU=101,05-2
25-SEP-90
PLOT= 16.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM



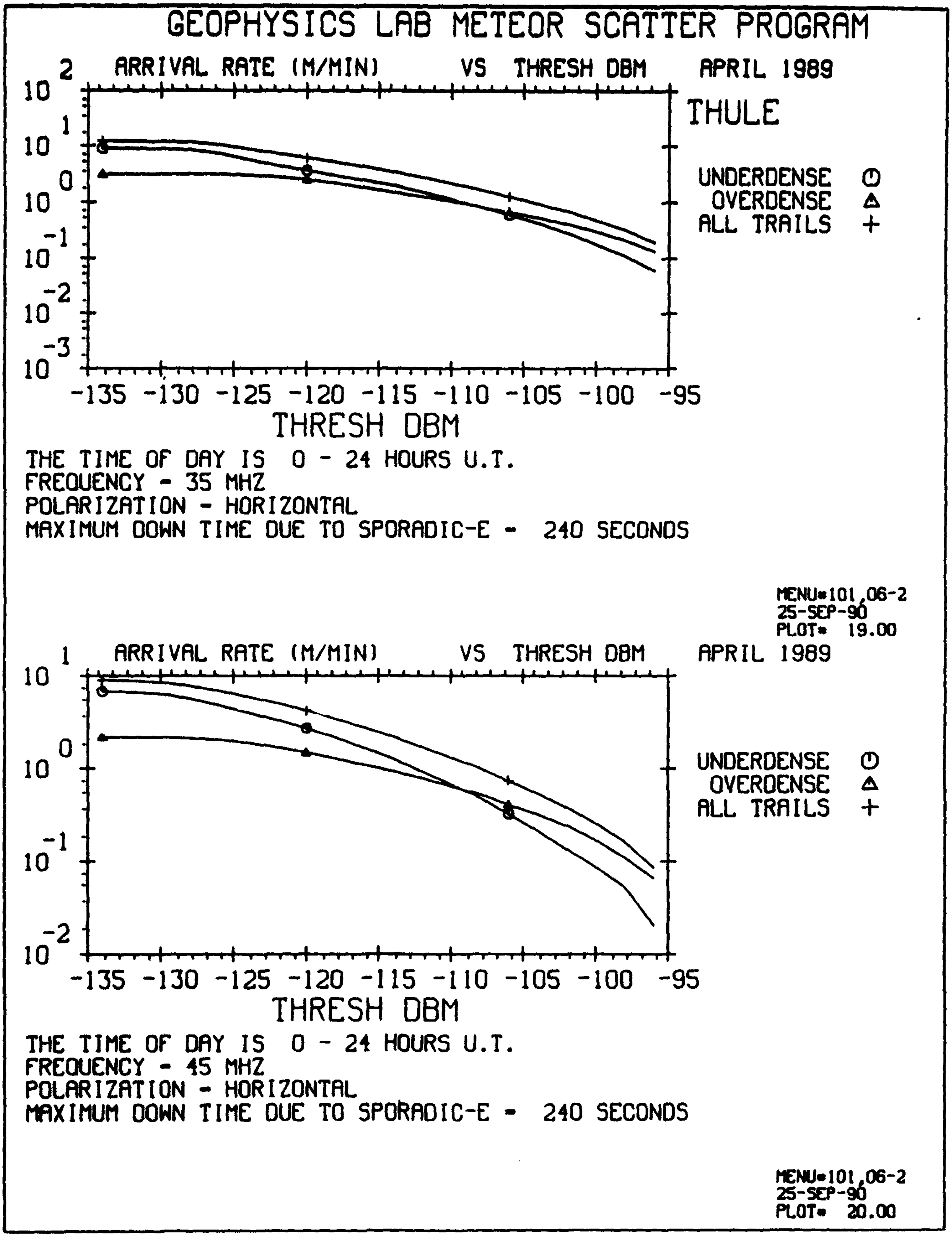

EXCEEDING -106.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

MENU=101,05-2
25-SEP-90
PLOT= 17.00

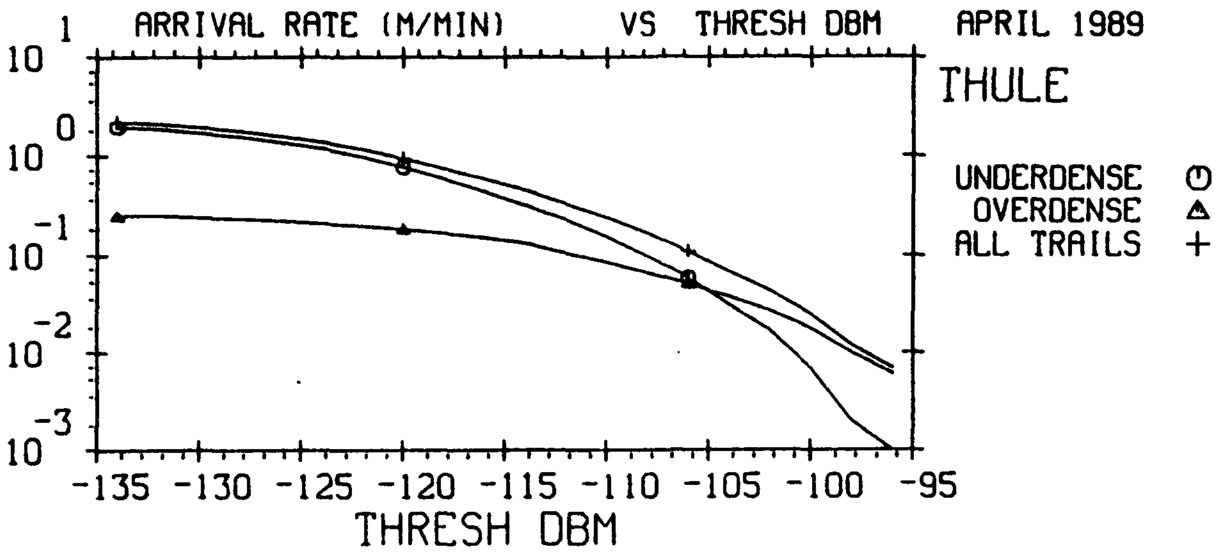



EXCEEDING -106.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

MENU=101,05-2
25-SEP-90
PLOT= 18.00

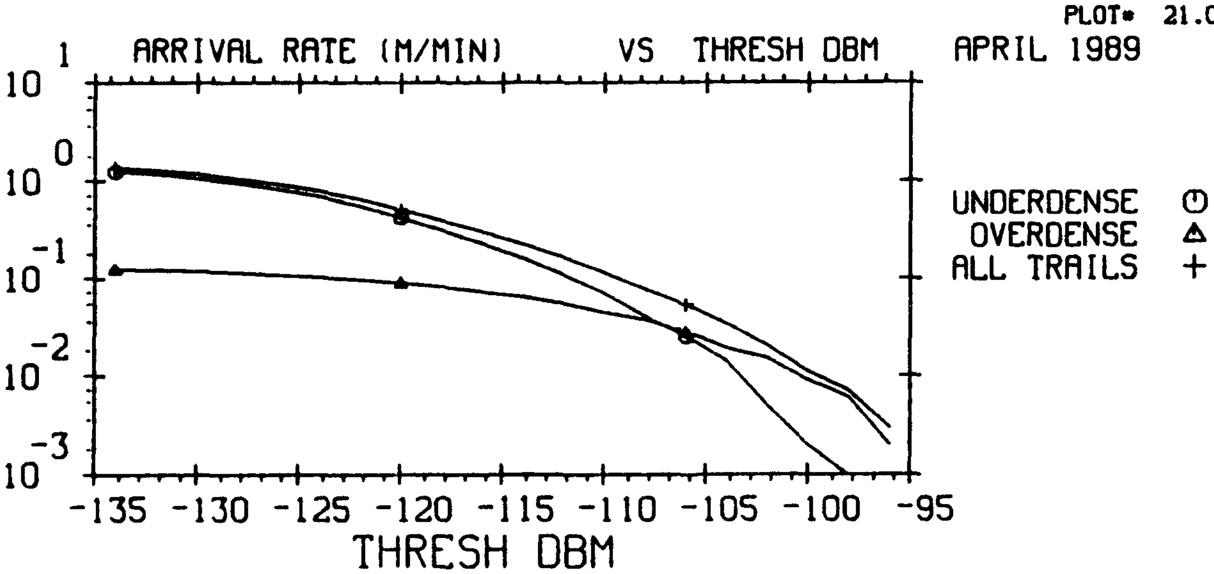

GEOPHYSICS LAB METEOR SCATTER PROGRAM
ARRIVAL RATE (M/MIN) VS THRESH DBM APRIL 1989
THULE
UNDERDENSE O
OVERDENSE Δ
ALL TRAILS +
10^2 10^1 10^0 10^-1 10^-2 10^-3
-135 -130 -125 -120 -115 -110 -105 -100 -95
THRESH DBM
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
MENU=101,06-2
25-SEP-90
PLOT= 19.00
ARRIVAL RATE (M/MIN) VS THRESH DBM APRIL 1989
UNDERDENSE O
OVERDENSE Δ
ALL TRAILS +
10^1 10^0 10^-1 10^-2
-135 -130 -125 -120 -115 -110 -105 -100 -95
THRESH DBM
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
MENU=101,06-2
25-SEP-90
PLOT= 20.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

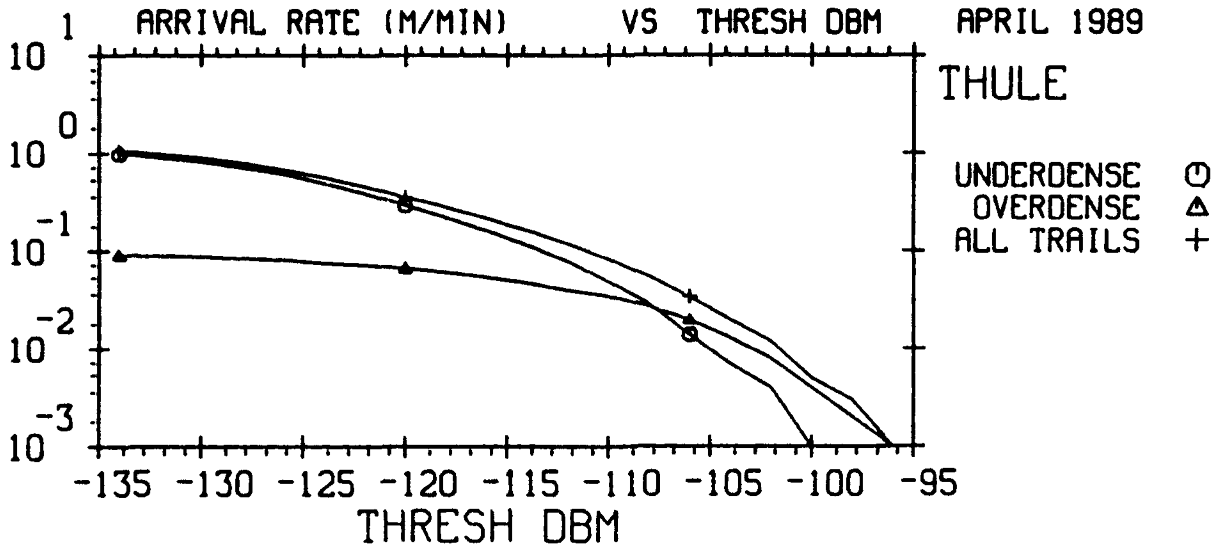
MENU=101,06-2
25-SEP-90
PLOT= 21.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

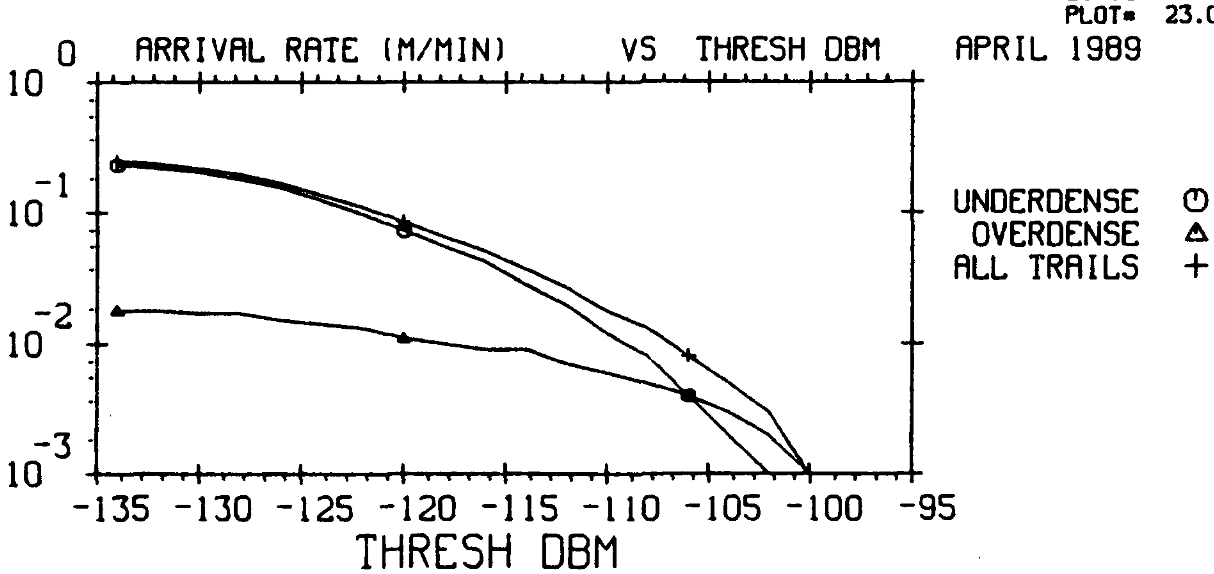
MENU=101,06-2
25-SEP-90
PLOT= 22.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

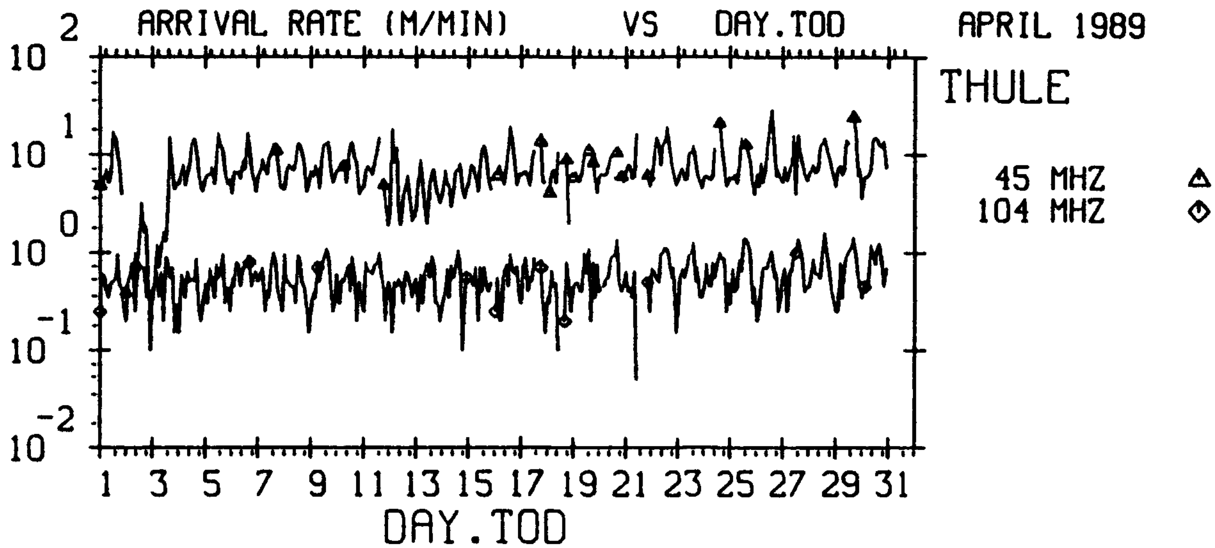
MENU=101,06-2
25-SEP-90
PLOT= 23.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

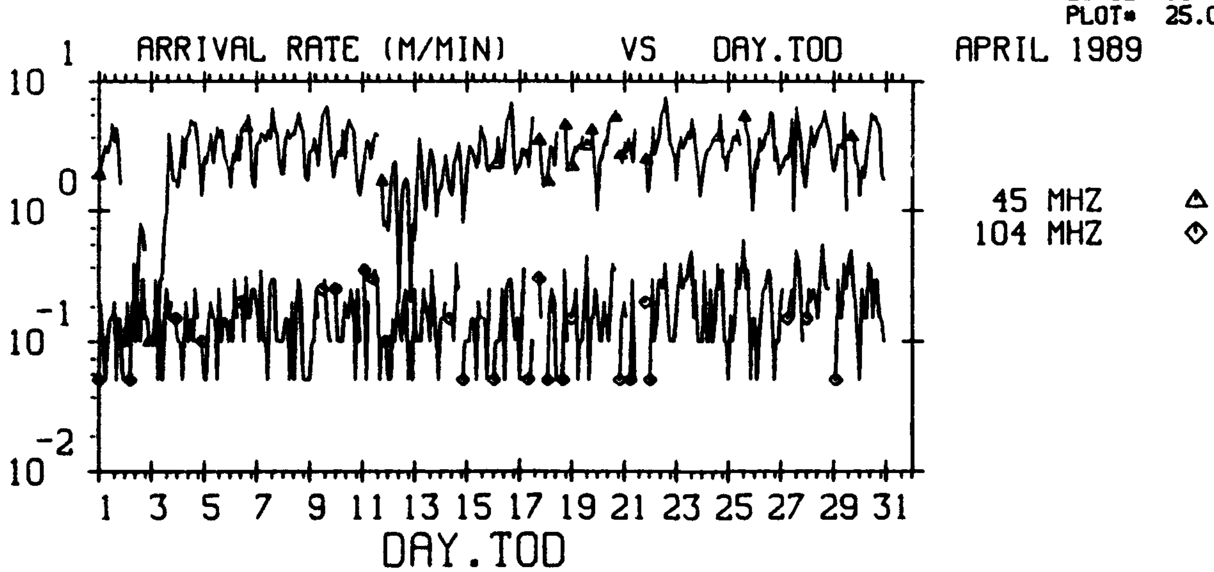
MENU=101,06-2
25-SEP-90
PLOT= 24.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

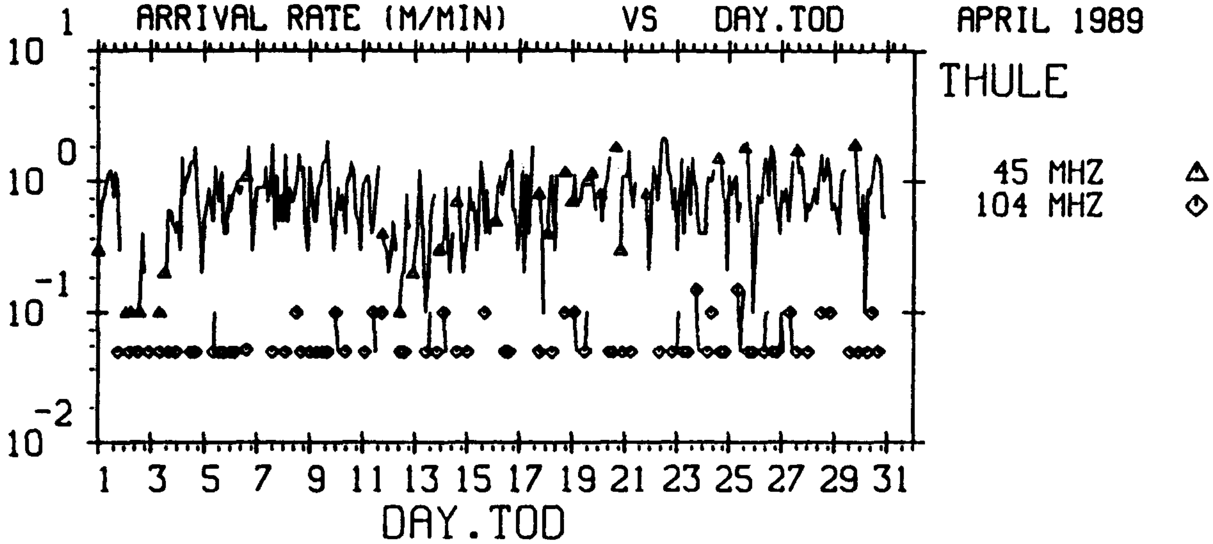
MENU=101,03-2
25-SEP-90
PLOT= 25.00




EXCEEDING -116.0 DBM RSL
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

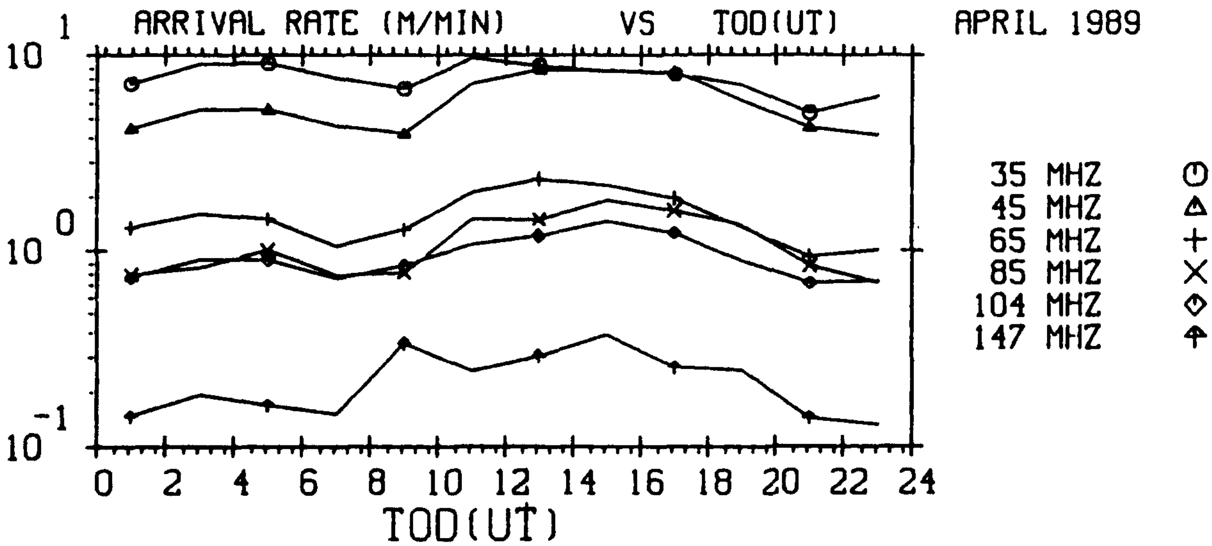
MENU=101,03-2
25-SEP-90
PLOT= 26.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS

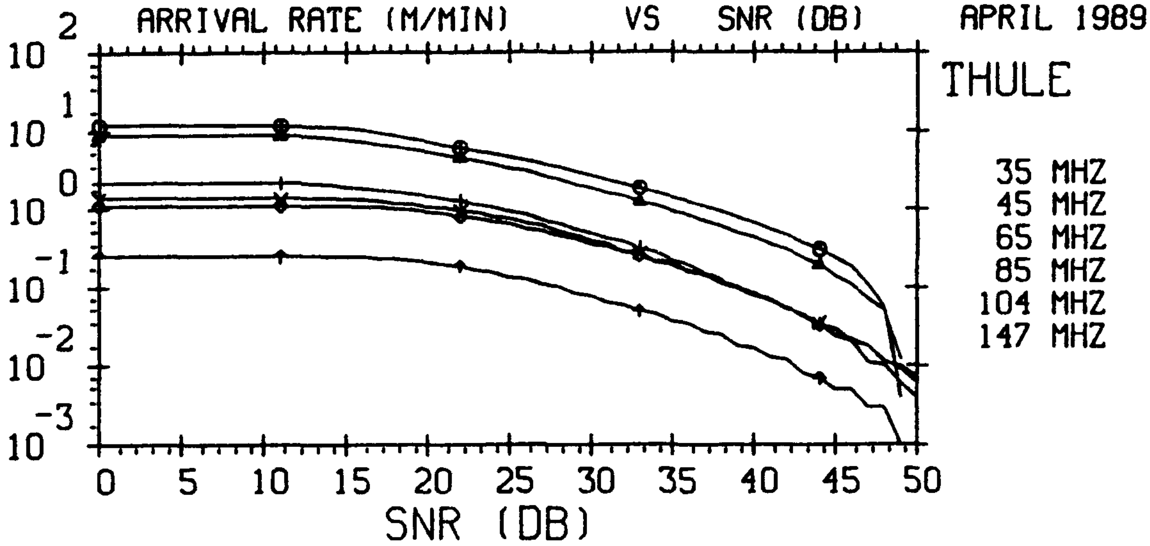
MENU=101,03-2
25-SEP-90
PLOT= 27.00




EXCEEDING 19.0 DB SNR
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

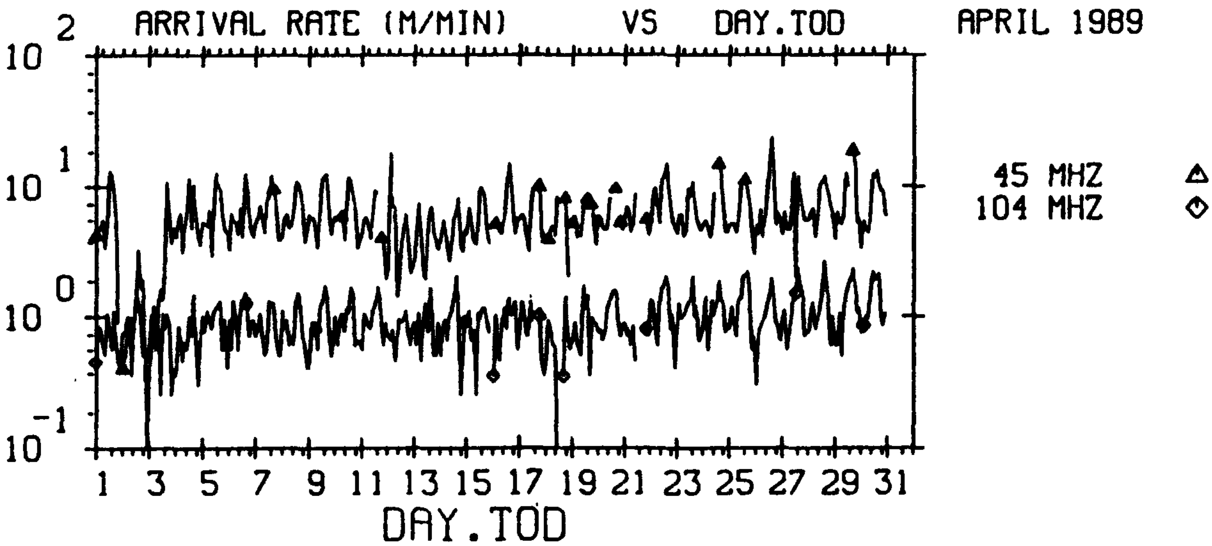
MENU=102,01-2
25-SEP-90
PLOT= 28.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

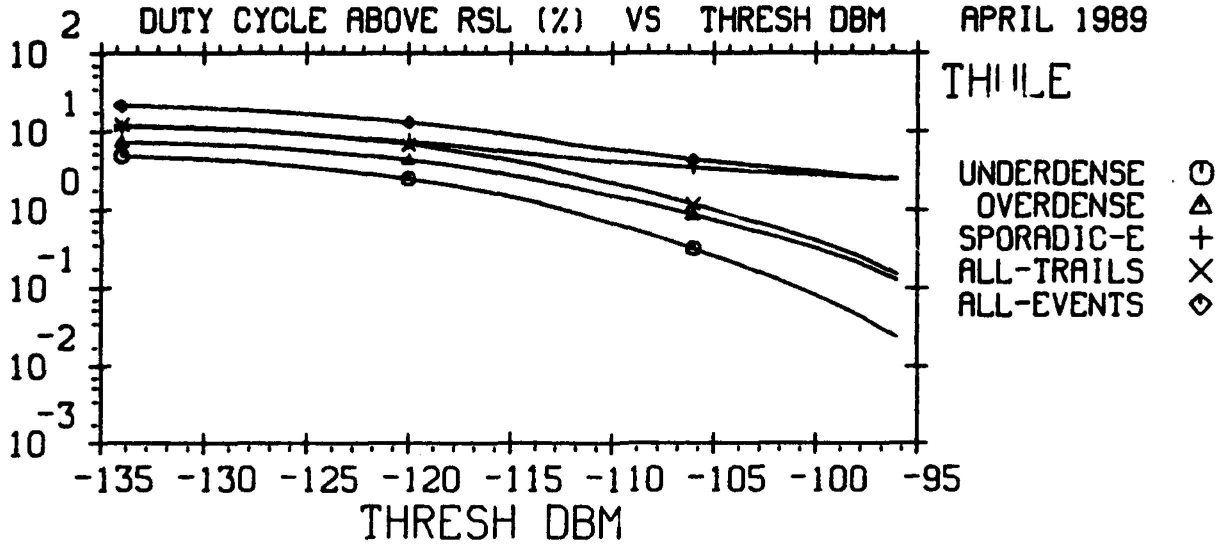
MENU=102,02-2
25-SEP-90
PLOT= 29.00




EXCEEDING 19.0 DB SNR
TYPE OF METEOR TRAIL - UNDERDENSE AND OVERDENSE
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
MAXIMUM DOWN TIME DUE TO SPORADIC-E - 240 SECONDS
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

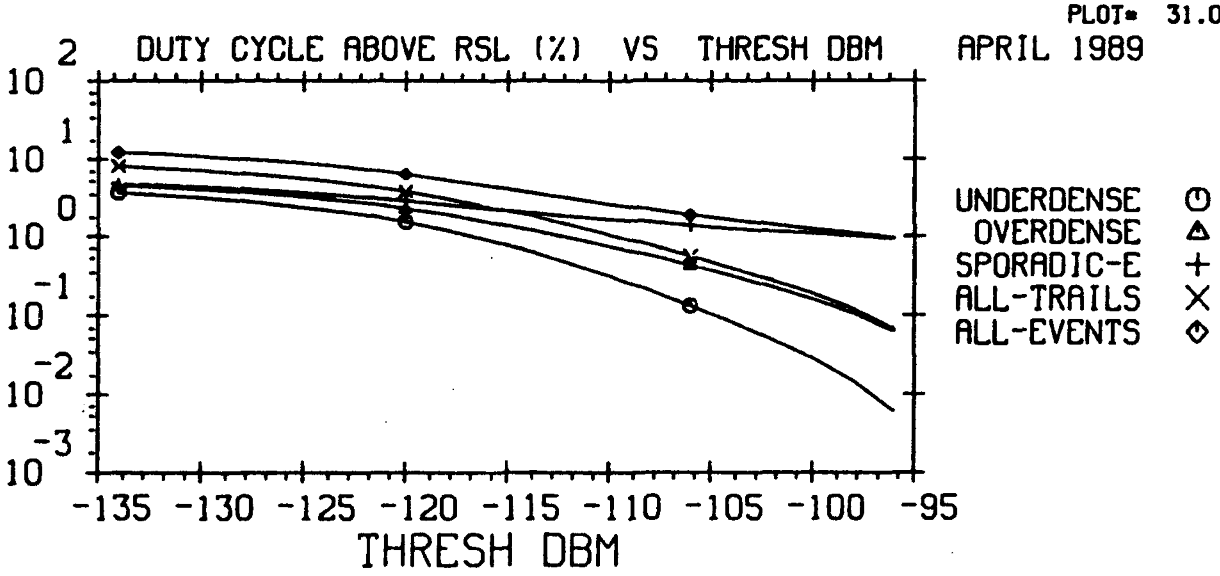
MENU=102,03-2
25-SEP-90
PLOT= 30.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

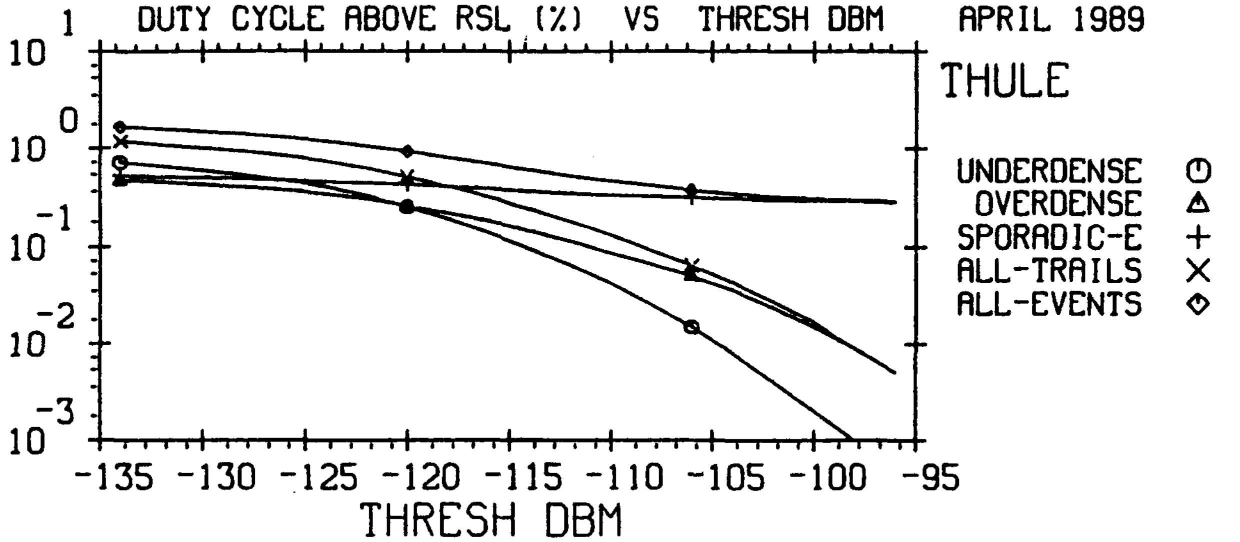
MENU=103,06-2
25-SEP-90
PLOT= 31.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

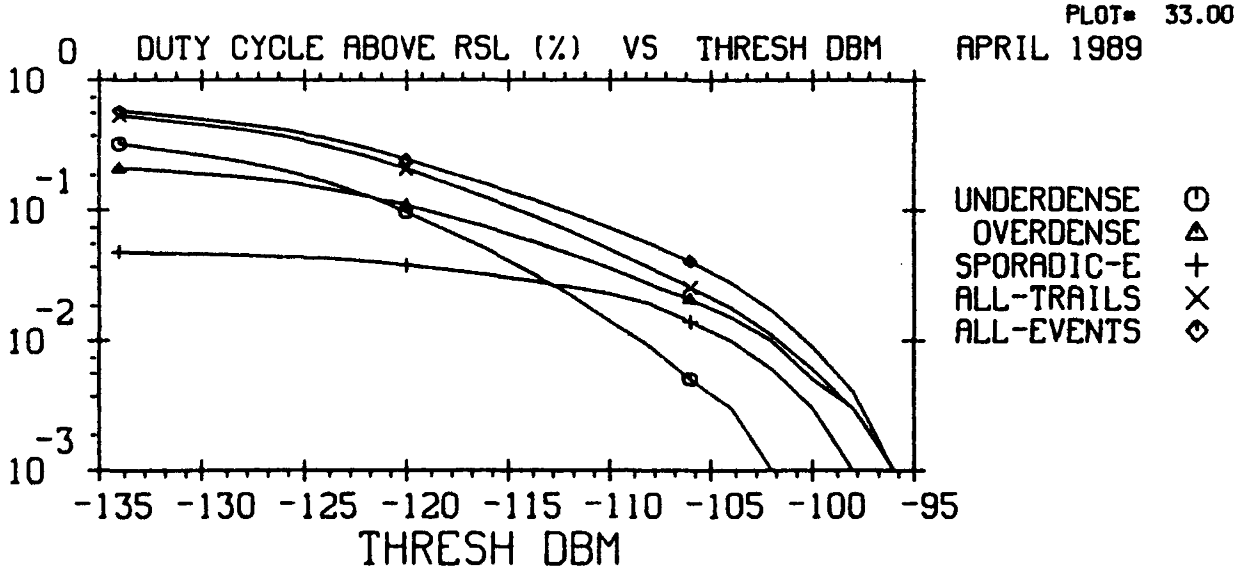
MENU=103,06-2
25-SEP-90
PLOT= 32.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

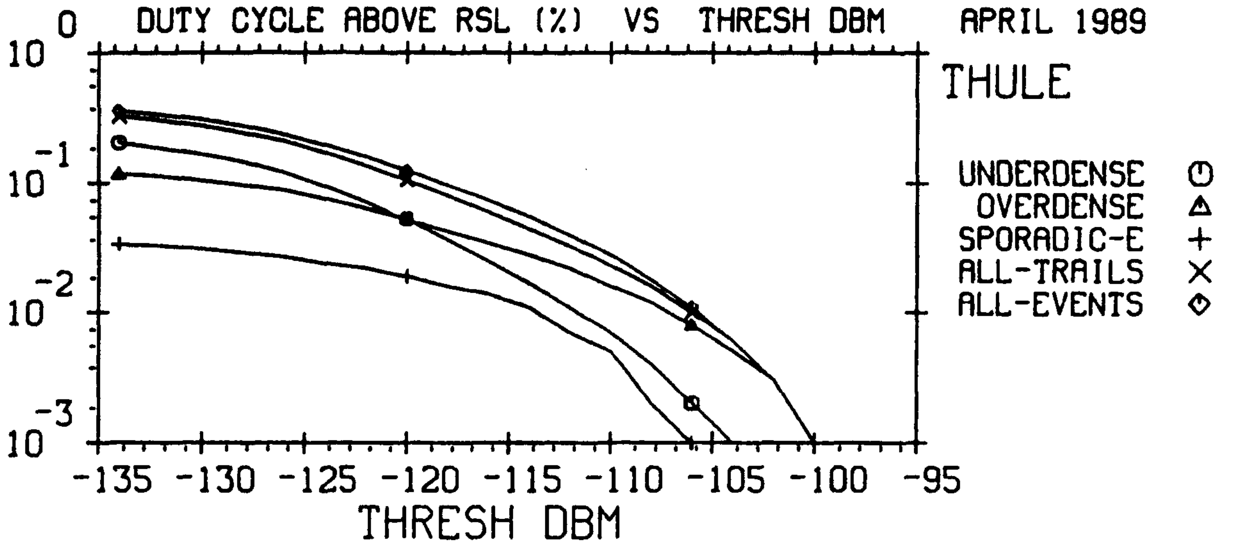
MENU=103,06-2
25-SEP-90
PLOT= 33.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

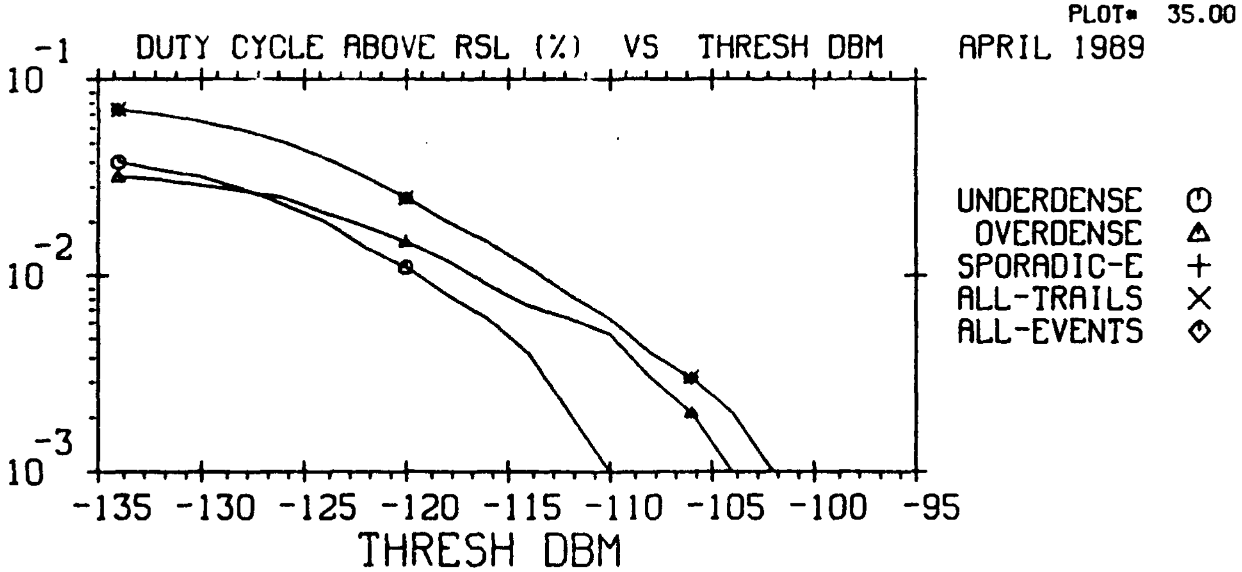
MENU=103,06-2
25-SEP-90
PLOT= 34.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

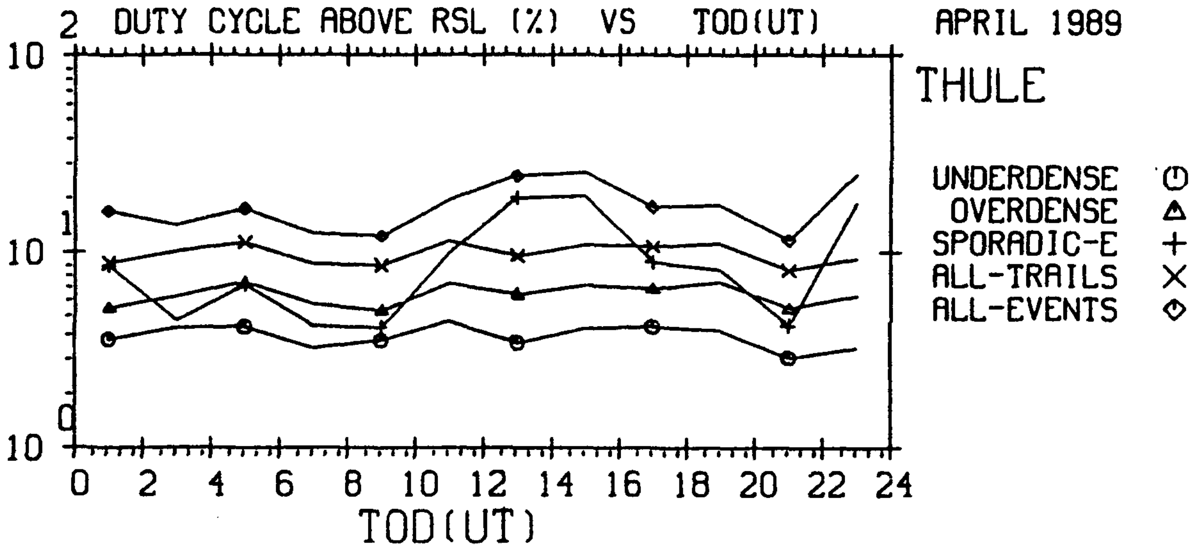
MENU=103,06-2
25-SEP-90
PLOT= 35.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

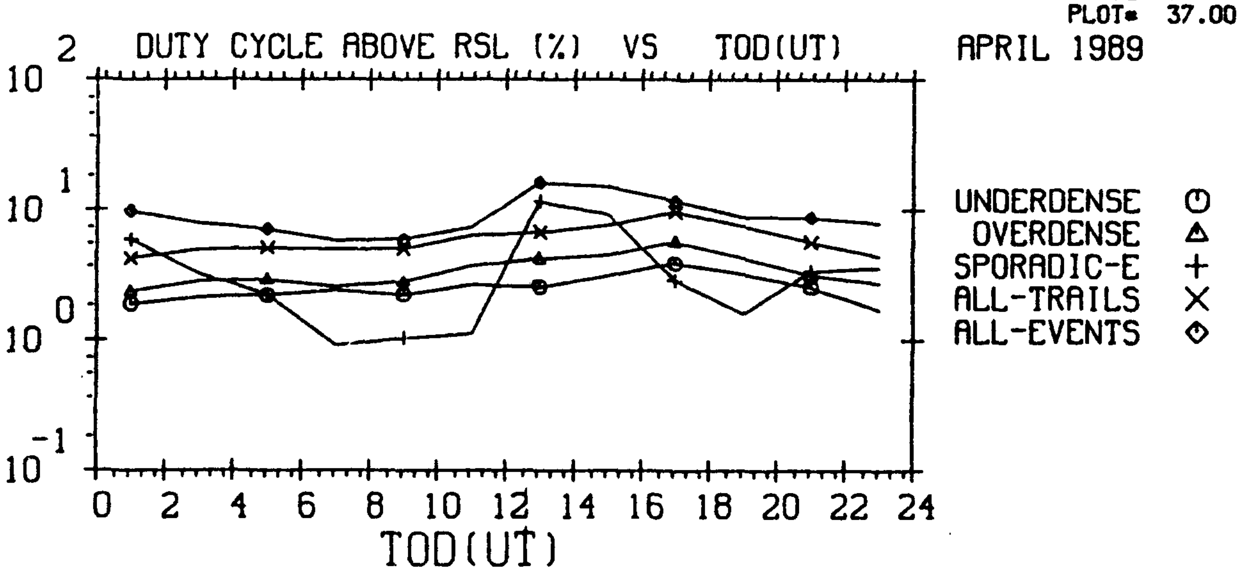
MENU=103,06-2
25-SEP-90
PLOT= 36.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

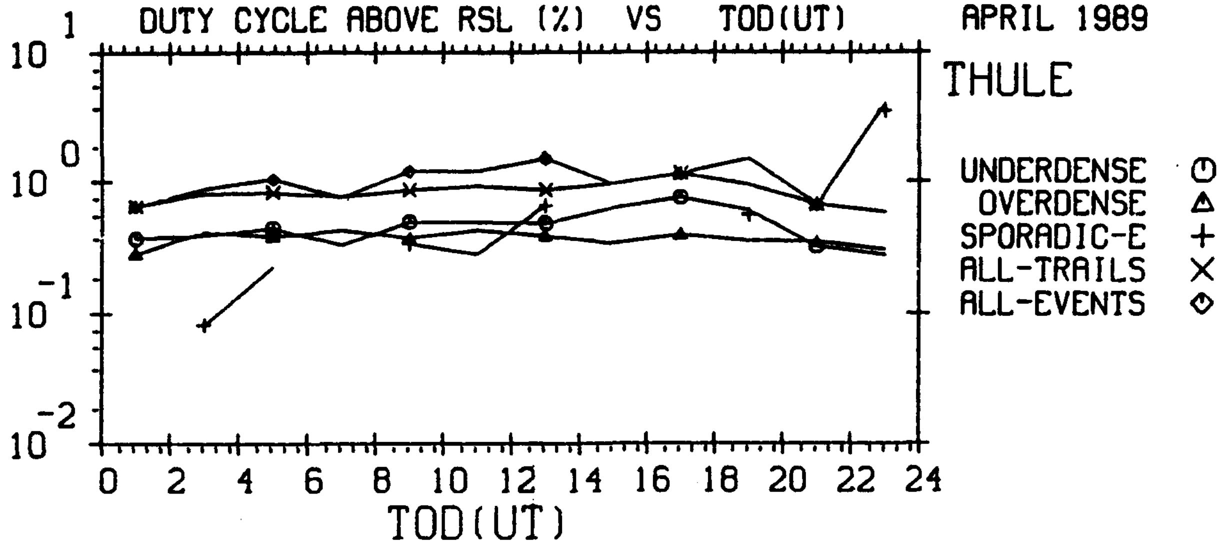
MENU=103,07-2
25-SEP-90
PLOT= 37.00




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

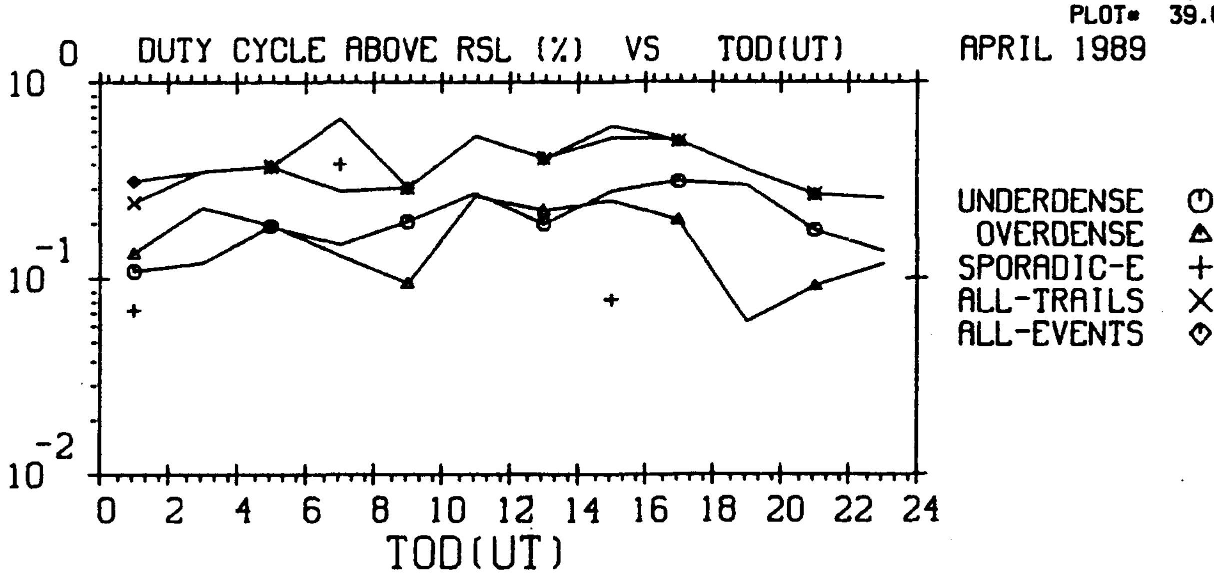
MENU=103,07-2
25-SEP-90
PLOT= 38.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

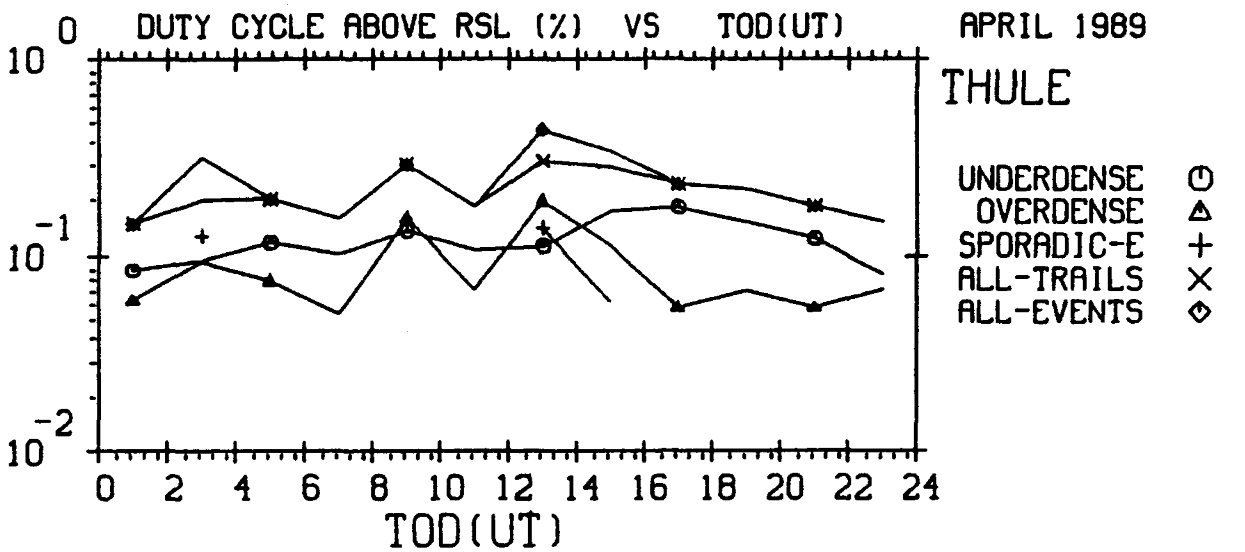
MENU=103,07-2
25-SEP-90
PLOT= 39.00




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

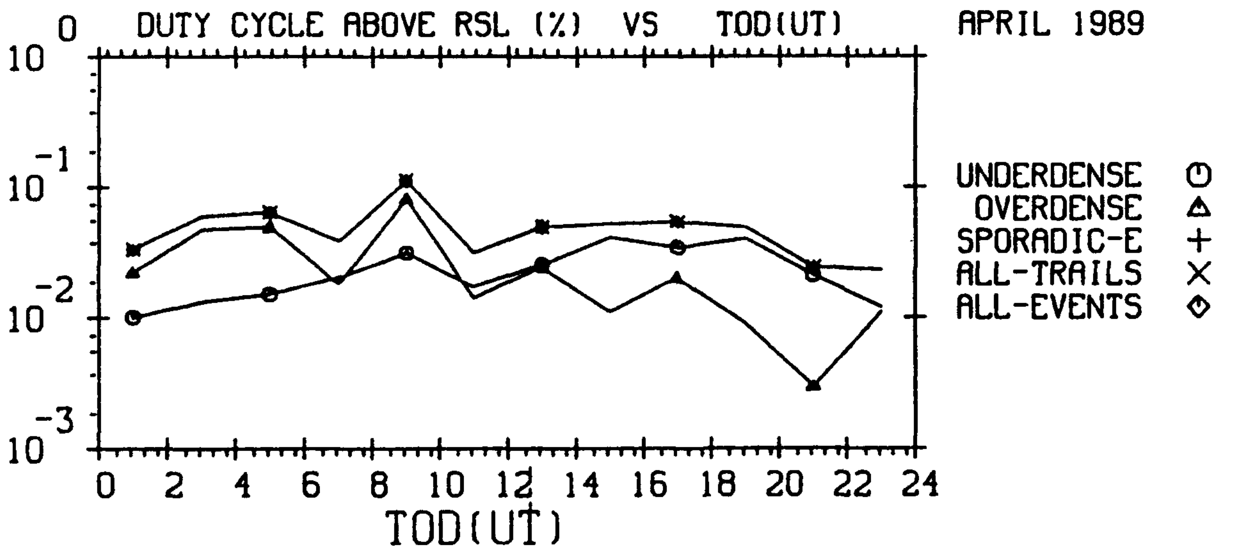
MENU=103,07-2
25-SEP-90
PLOT= 40.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

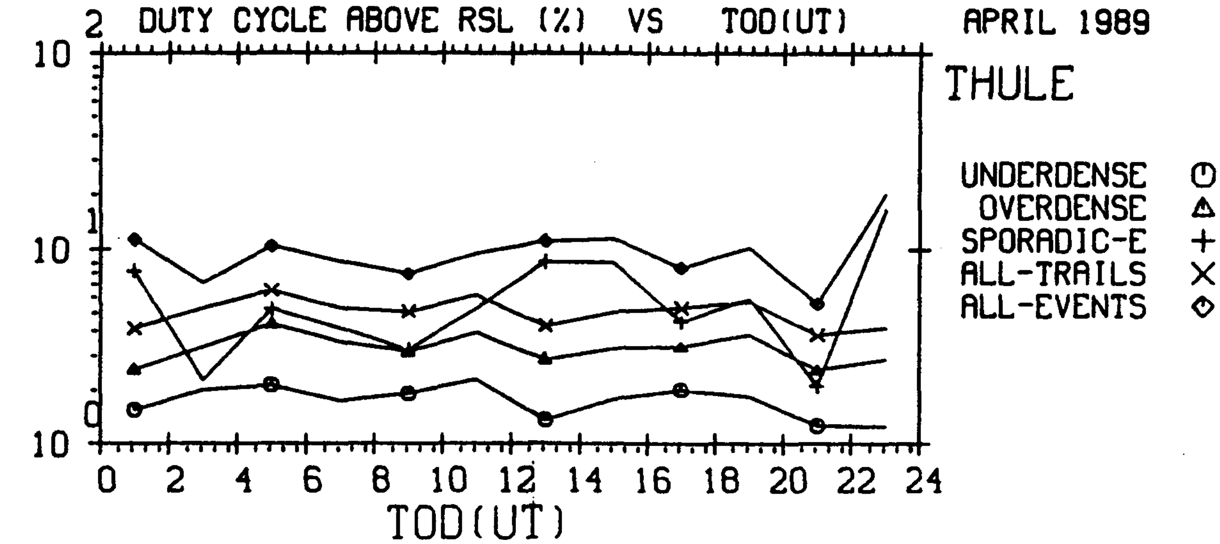
MENU=103,07-2
25-SEP-90
PLOT= 41.00




THRESHOLD - -126.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

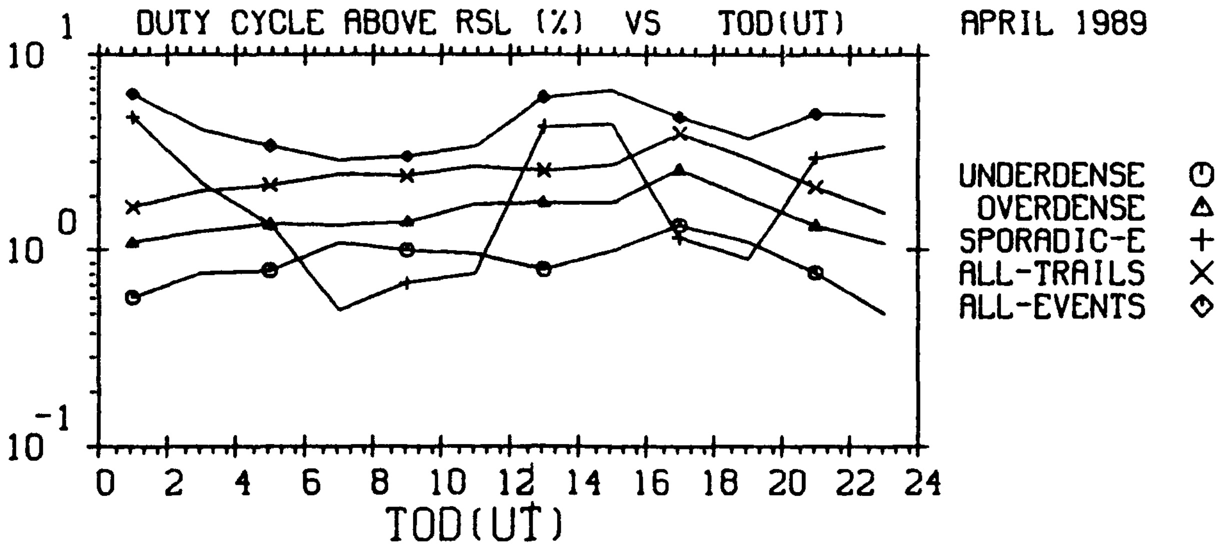
MENU=103,07-2
25-SEP-90
PLOT= 42.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

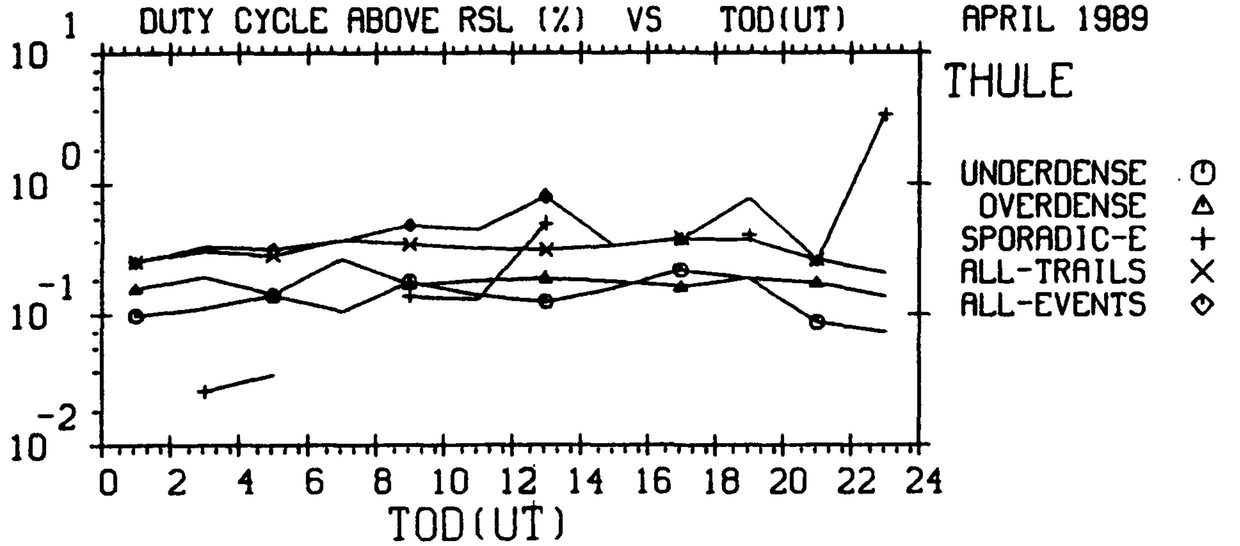
MENU=103,07-2
25-SEP-90
PLOT= 43.00




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

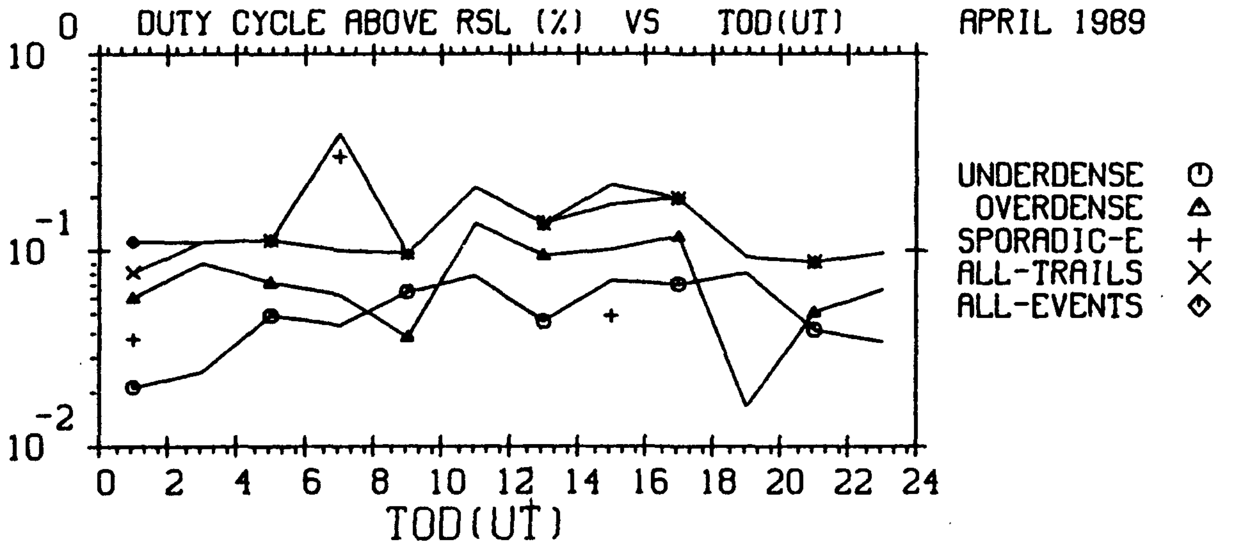
MENU=103,07-2
25-SEP-90
PLOT= 44.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

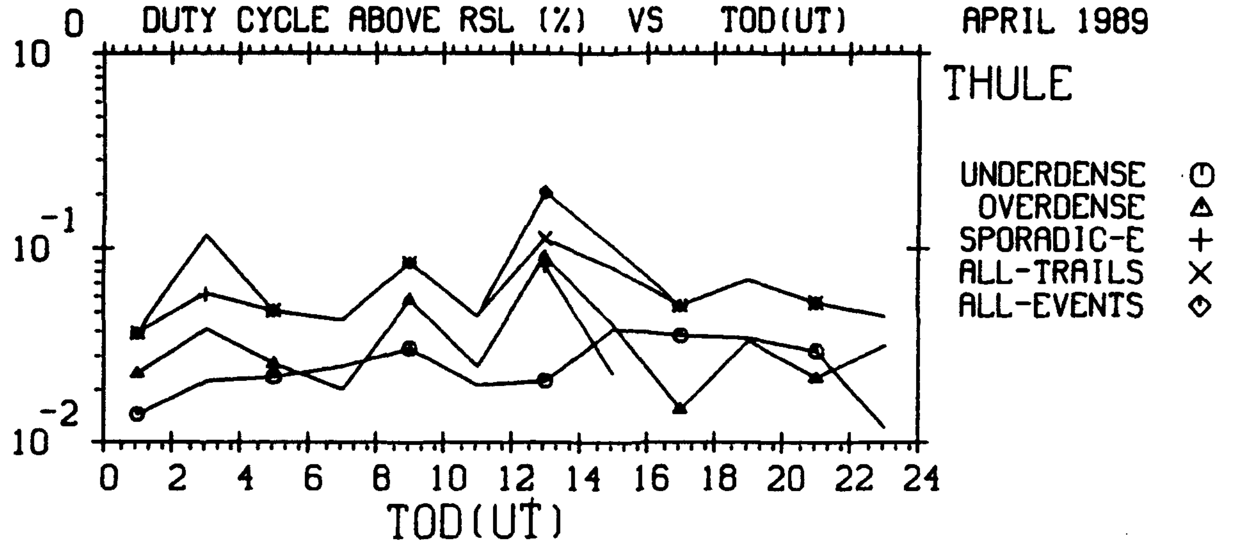
MENU=103,07-2
25-SEP-90
PLOT= 45.00




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

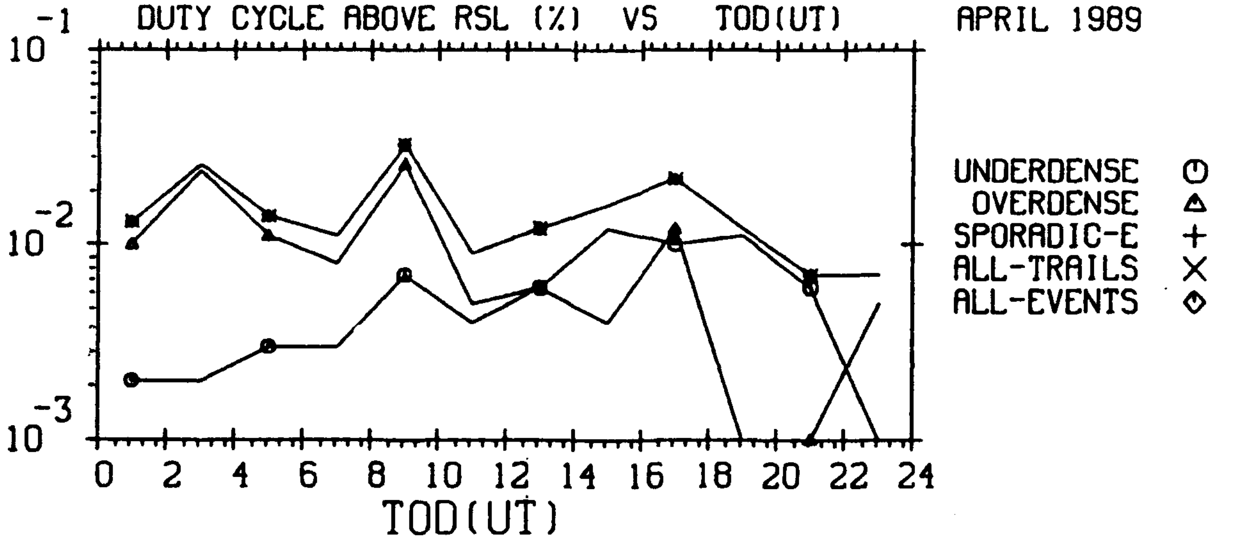
MENU=103,07-2
25-SEP-90
PLOT= 46.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

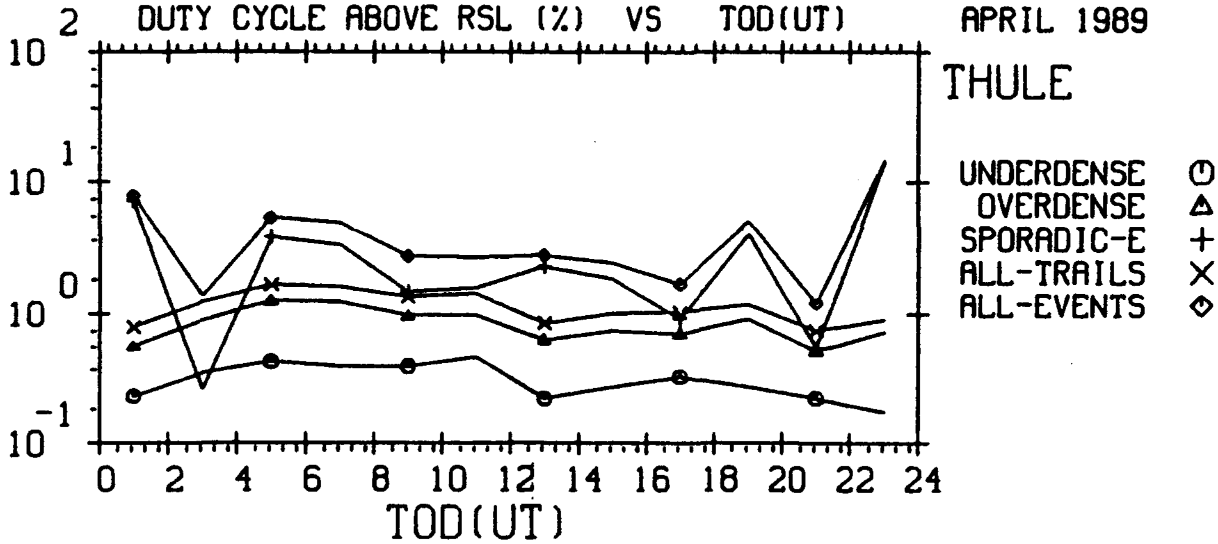
MENU=103,07-2
25-SEP-90
PLOT= 47.00




THRESHOLD - -116.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

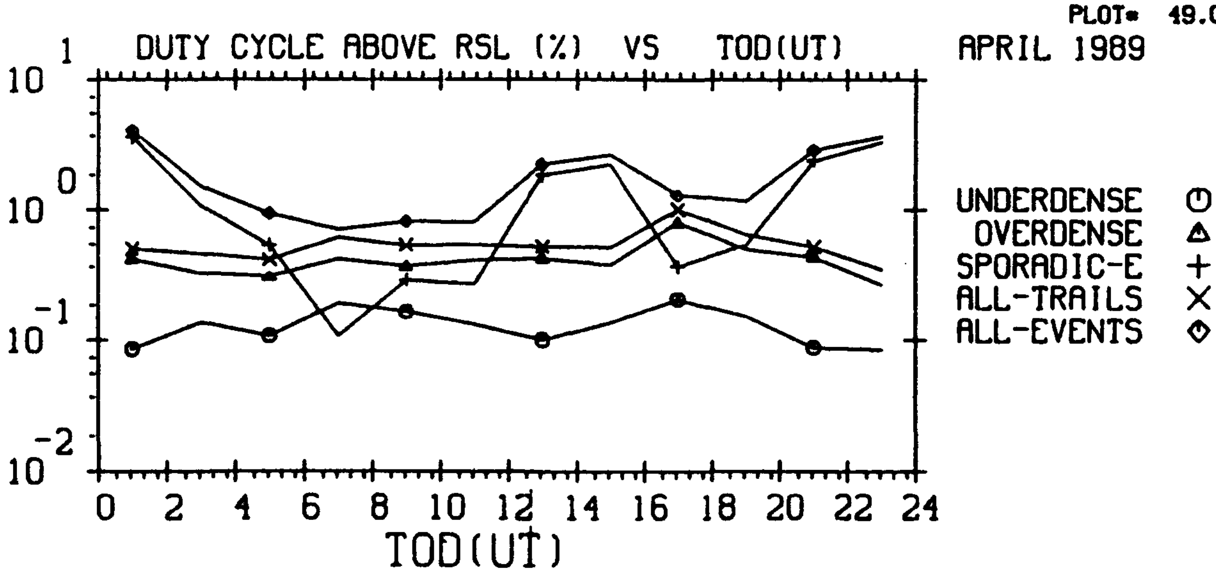
MENU=103,07-2
25-SEP-90
PLOT= 48.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 35 MHZ
POLARIZATION - HORIZONTAL

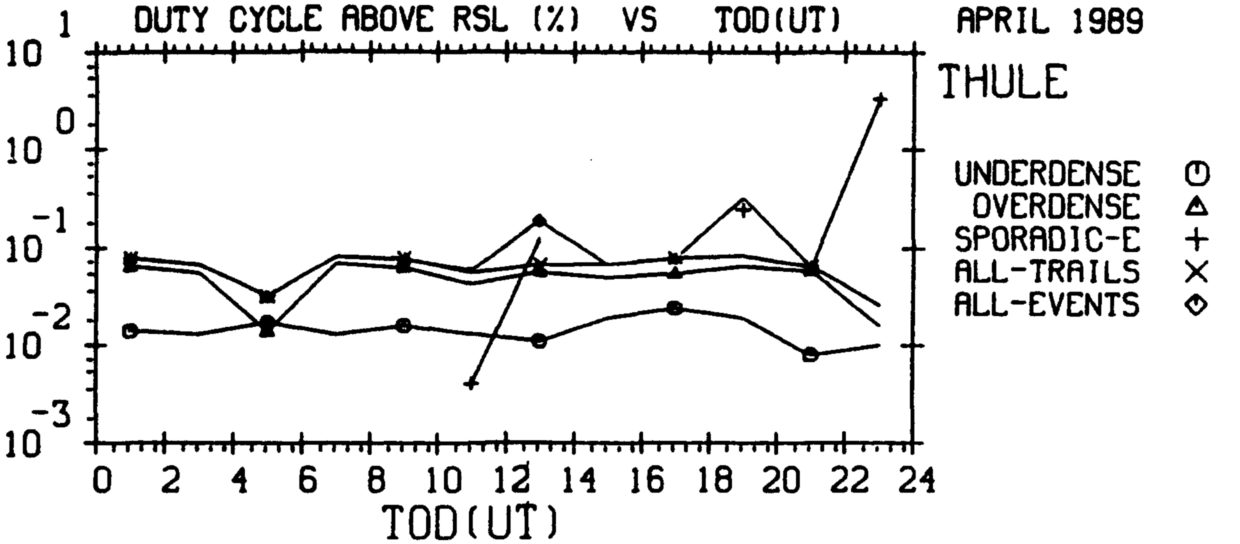
MENU=103,07-2
25-SEP-90
PLOT= 49.00




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 45 MHZ
POLARIZATION - HORIZONTAL

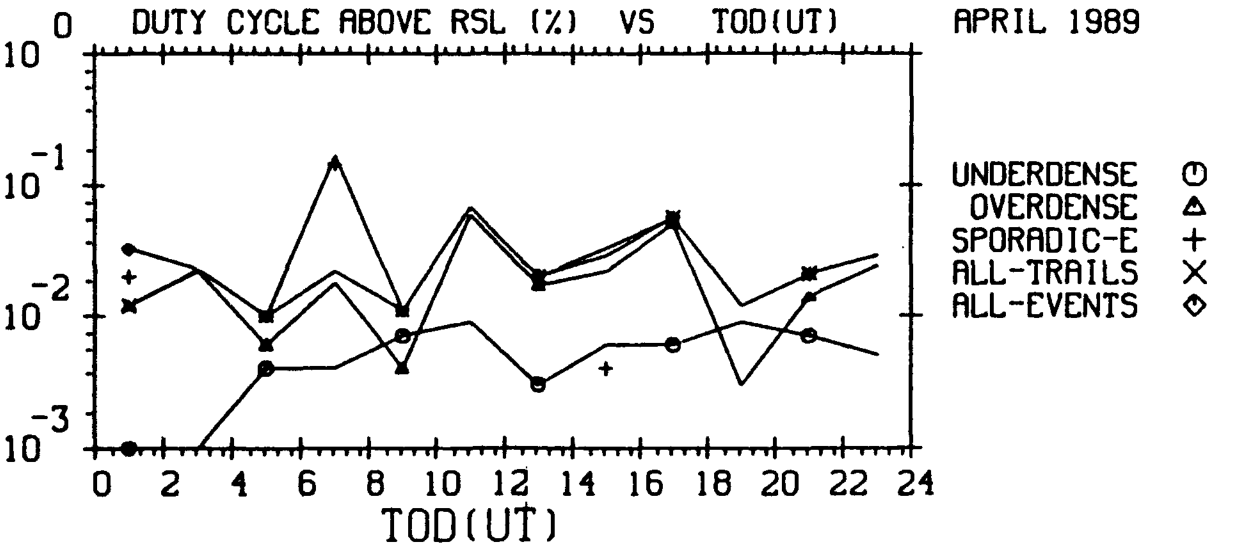
MENU=103,07-2
25-SEP-90
PLOT= 50.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 65 MHZ
POLARIZATION - HORIZONTAL

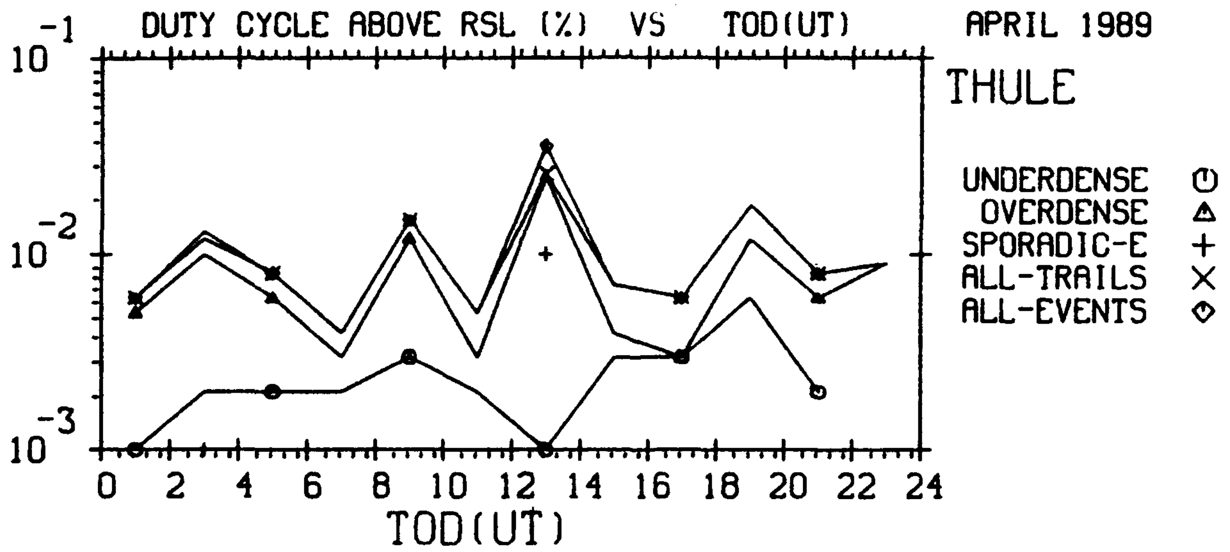
MENU=103,07-2
25-SEP-90
PLOT= 51.00




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 85 MHZ
POLARIZATION - HORIZONTAL

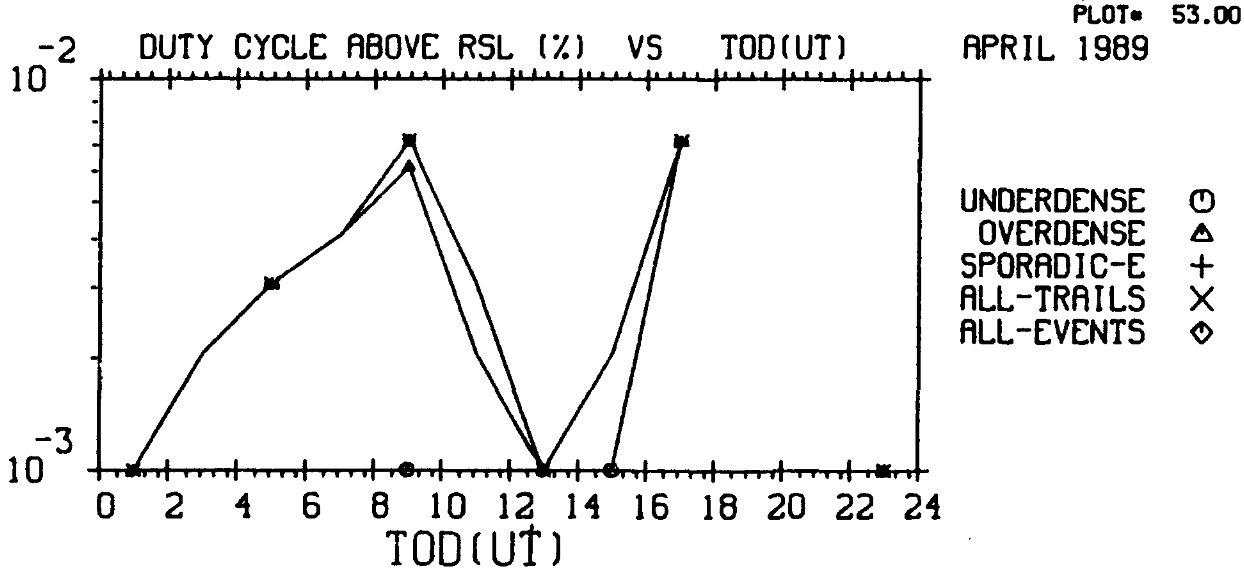
MENU=103,07-2
25-SEP-90
PLOT= 52.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 104 MHZ
POLARIZATION - HORIZONTAL

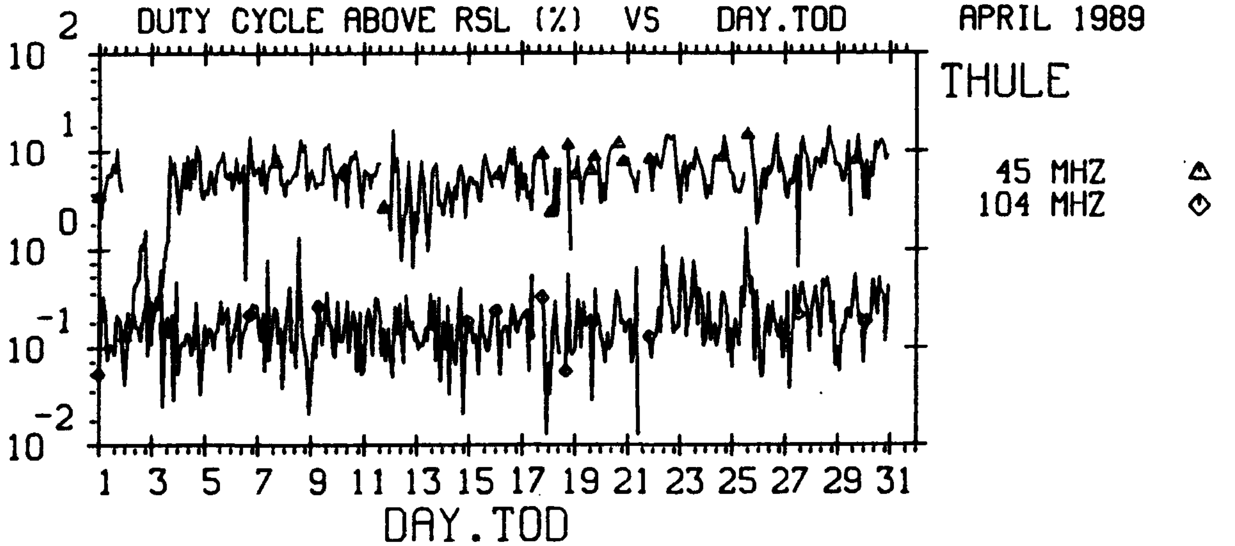
MENU=103,07-2
25-SEP-90
PLOT= 53.00




THRESHOLD - -106.0 DBM RSL
FREQUENCY - 147 MHZ
POLARIZATION - HORIZONTAL

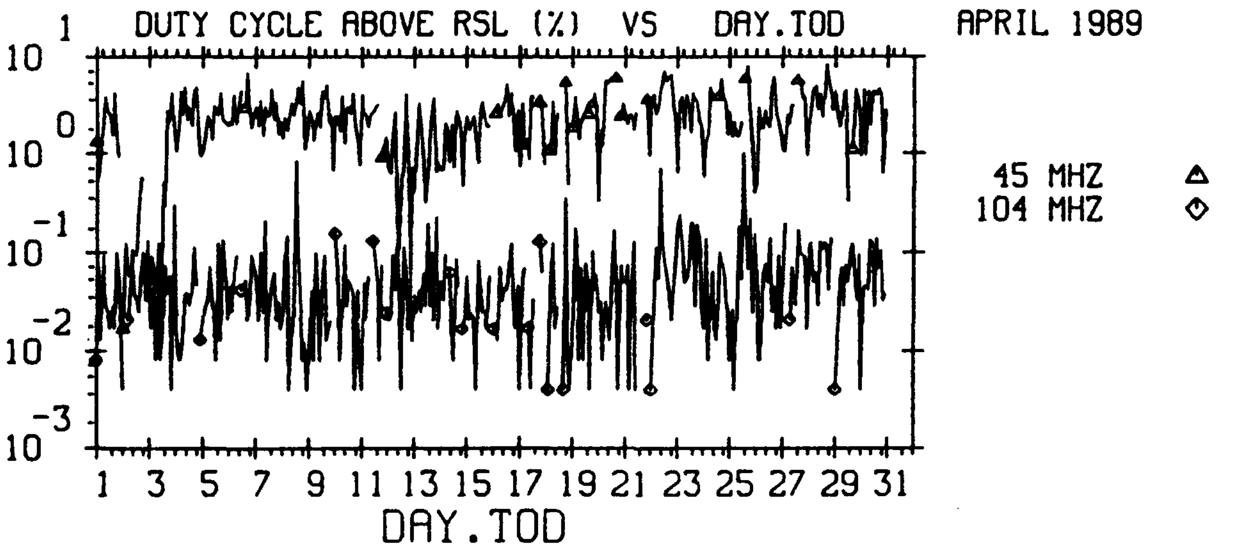
MENU=103,07-2
25-SEP-90
PLOT= 54.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM



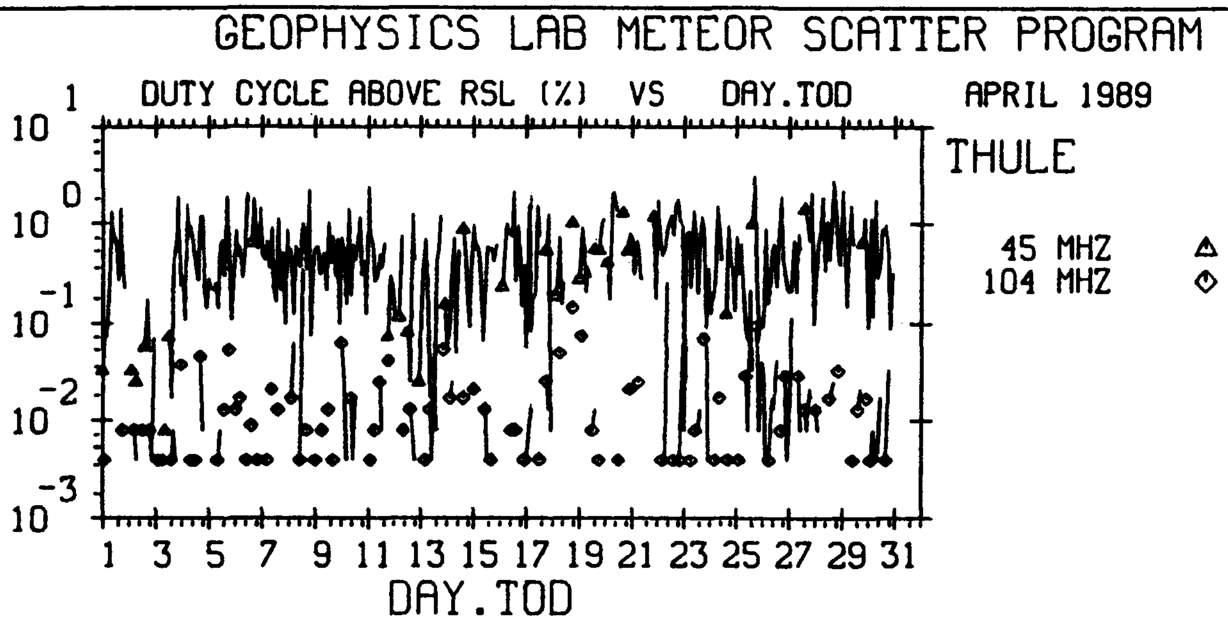

THRESHOLD - -126.0 DBM RSL
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
POLARIZATION - HORIZONTAL

MENU=103,09-2
25-SEP-90
PLOT= 55.00



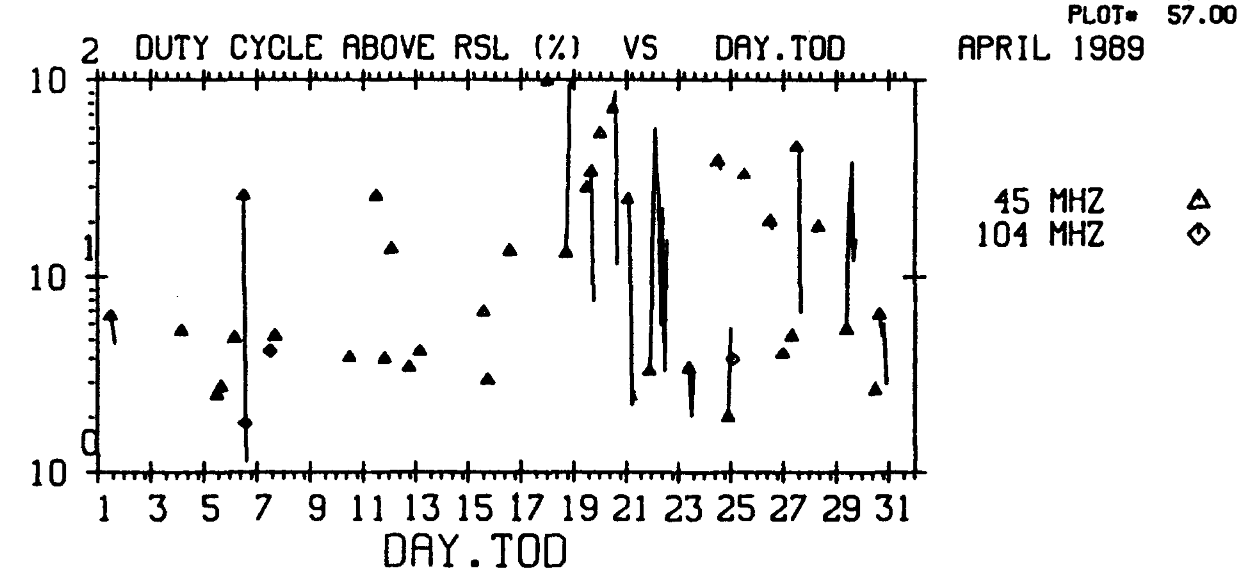

THRESHOLD - -116.0 DBM RSL
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
POLARIZATION - HORIZONTAL

MENU=103,09-2
25-SEP-90
PLOT= 56.00




THRESHOLD - -106.0 DBM RSL
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
POLARIZATION - HORIZONTAL

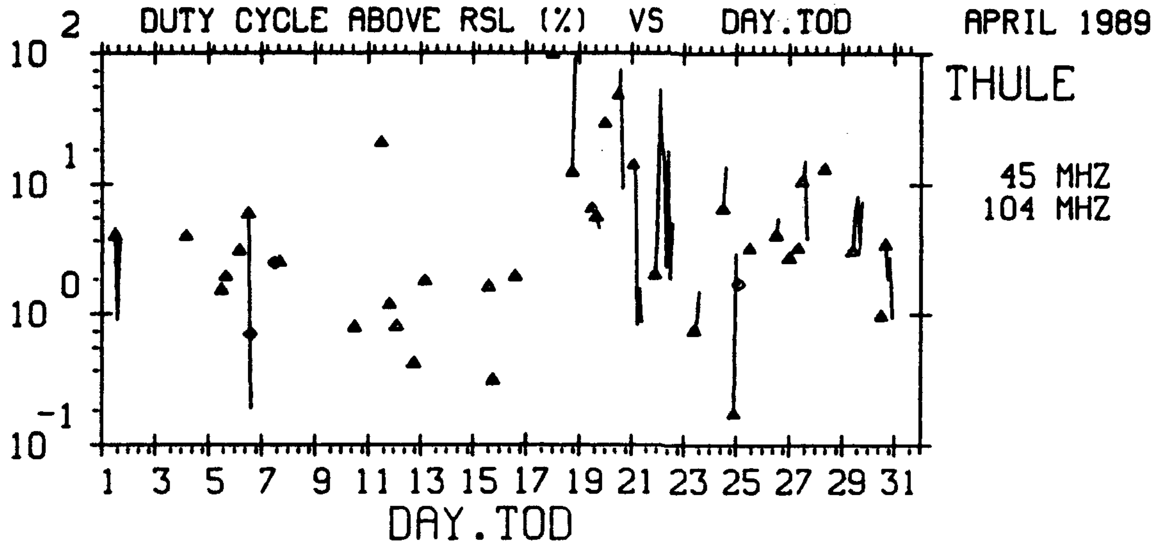
MENU=103,09-2
25-SEP-90
PLOT= 57.00




THRESHOLD - -126.0 DBM RSL
THE EVENT CLASS IS SPORADIC-E
POLARIZATION - HORIZONTAL

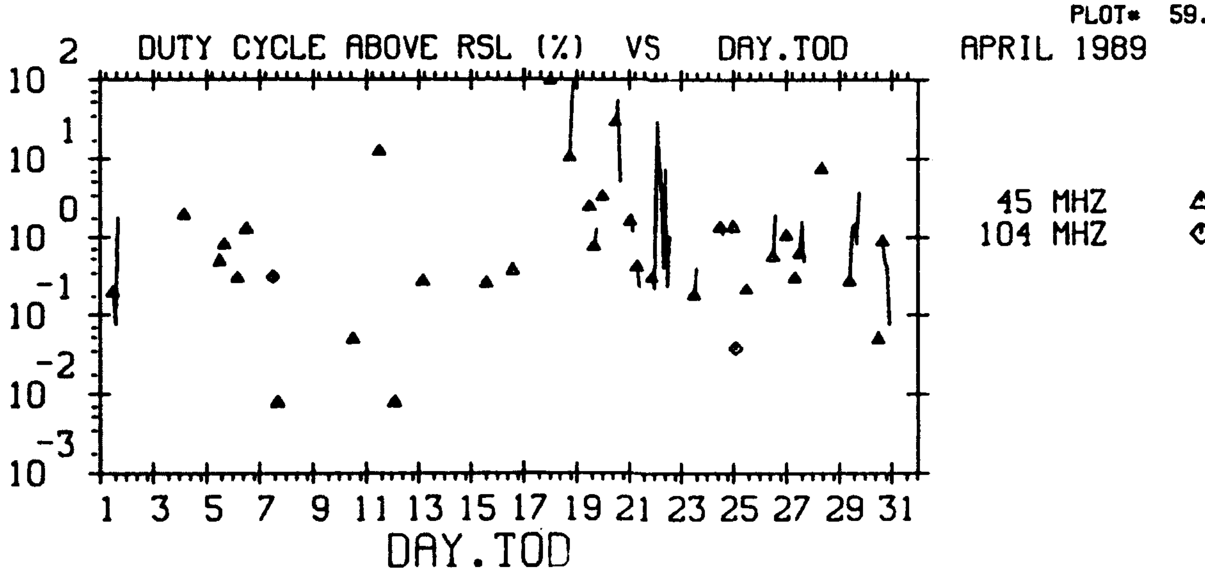
MENU=103,09-2
25-SEP-90
PLOT= 58.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THRESHOLD - -116.0 DBM RSL
THE EVENT CLASS IS SPORADIC-E
POLARIZATION - HORIZONTAL

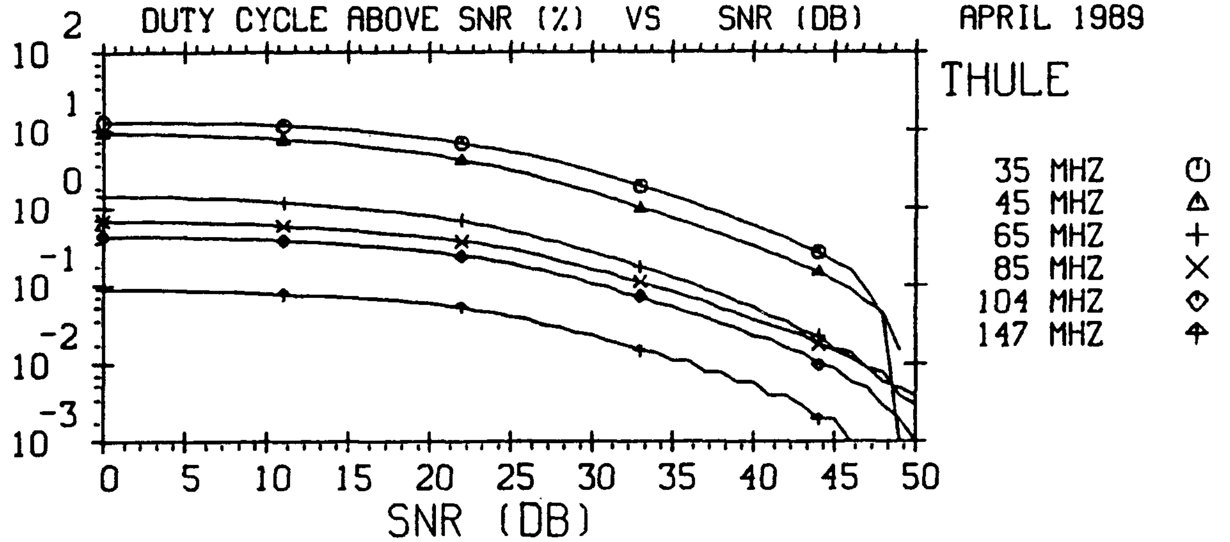
MENU=103,09-2
25-SEP-90
PLOT= 59.00




THRESHOLD - -106.0 DBM RSL
THE EVENT CLASS IS SPORADIC-E
POLARIZATION - HORIZONTAL

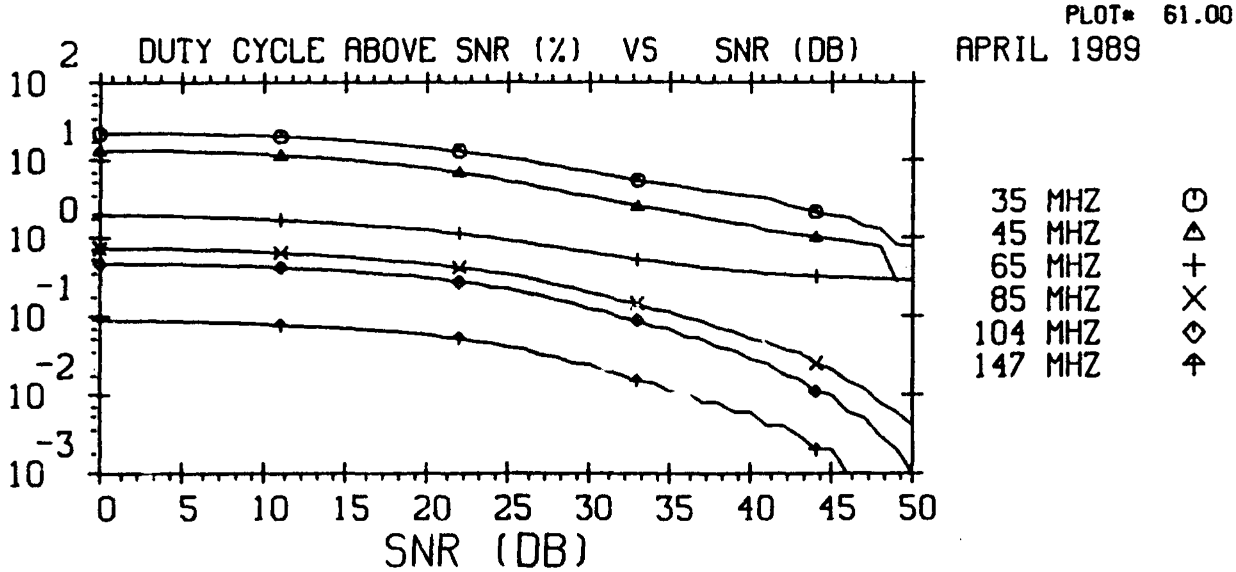
MENU=103,09-2
25-SEP-90
PLOT= 60.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

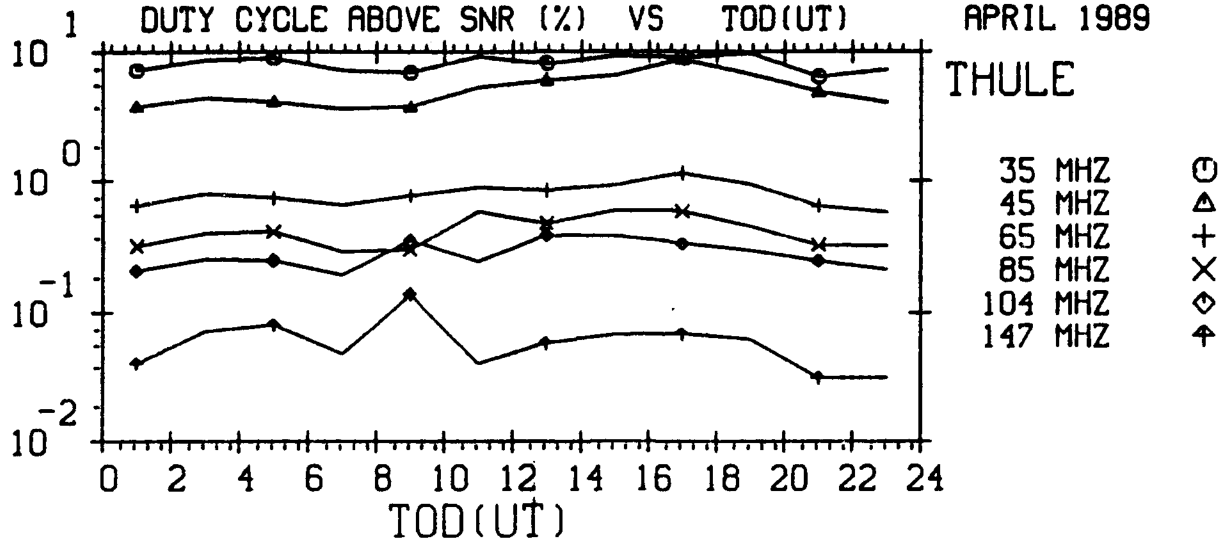
MENU=104,02-2
25-SEP-90
PLOT= 61.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

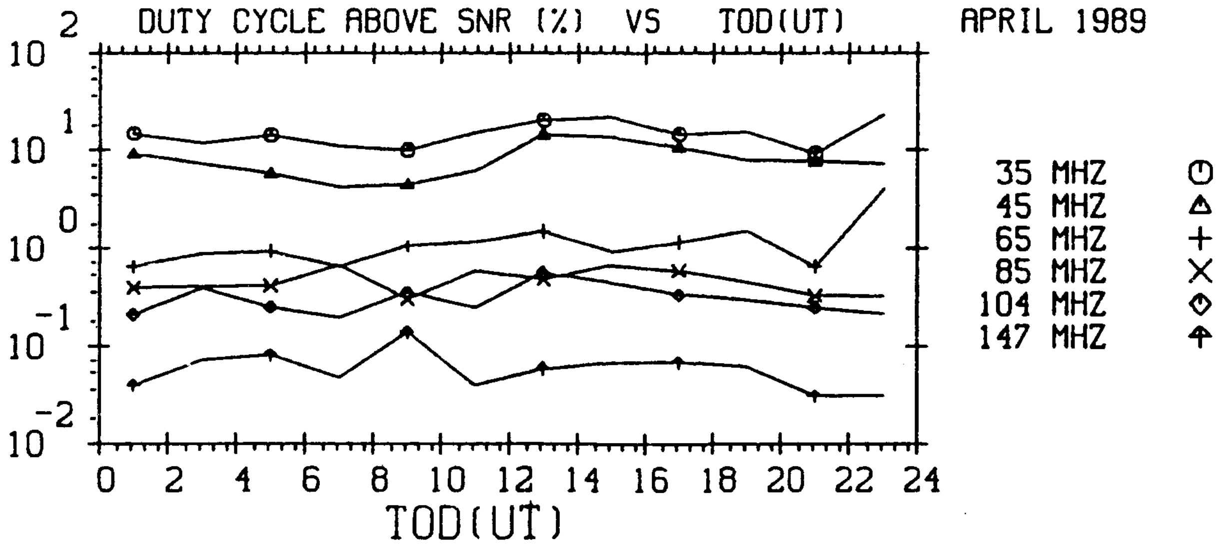
MENU=104,02-2
25-SEP-90
PLOT= 62.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

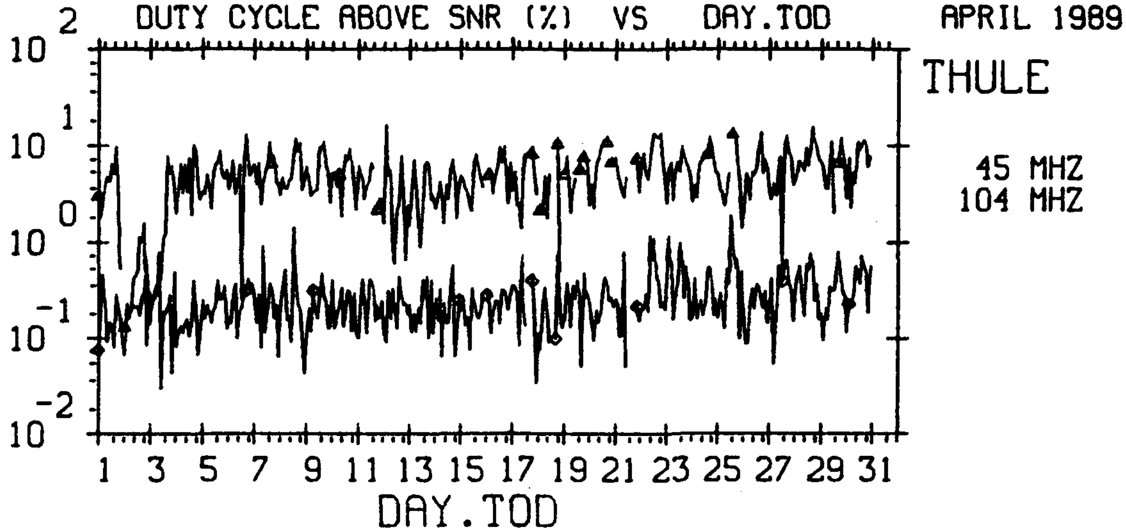
MENU=104,03-2
25-SEP-90
PLOT= 63.00




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

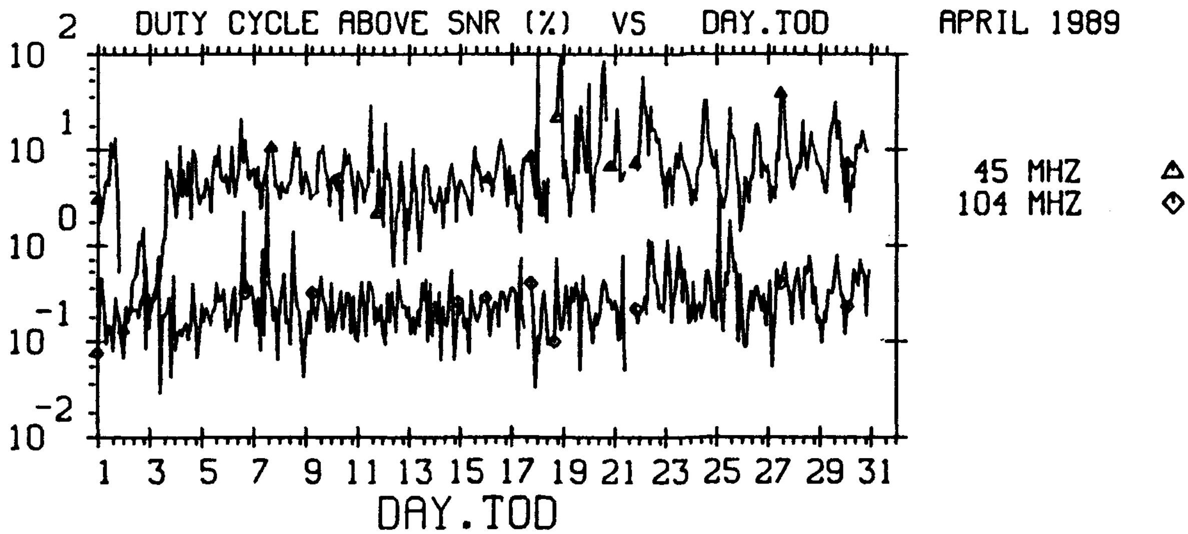
MENU=104,03-2
25-SEP-90
PLOT= 64.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

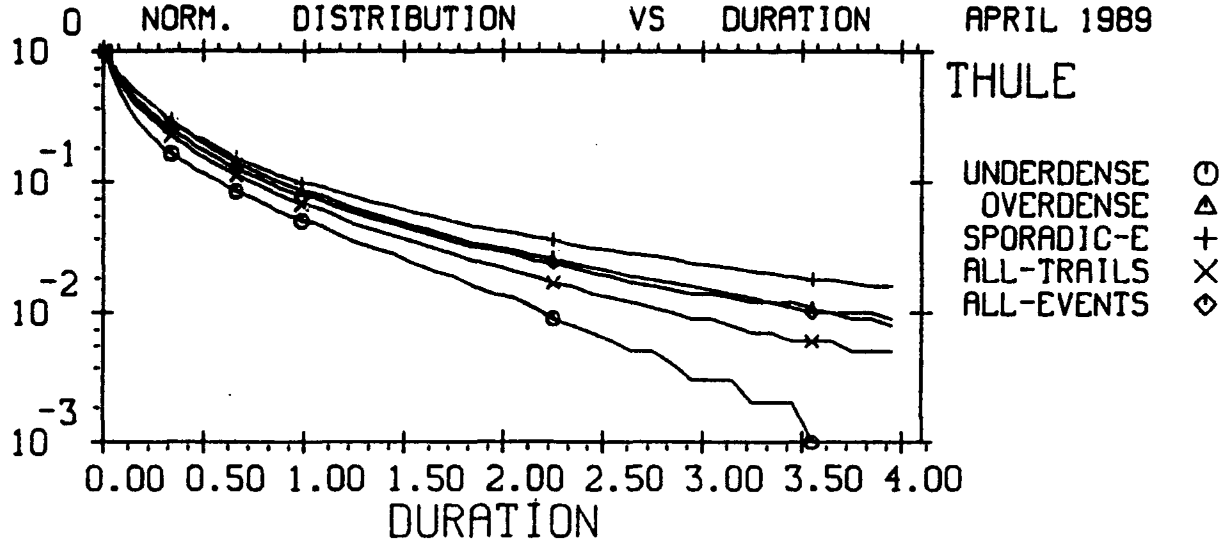
MENU=104,09-2
25-SEP-90
PLOT= 65.00




SIGNAL-TO-NOISE RATIO - 19.0 DB
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
POLARIZATION - HORIZONTAL
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

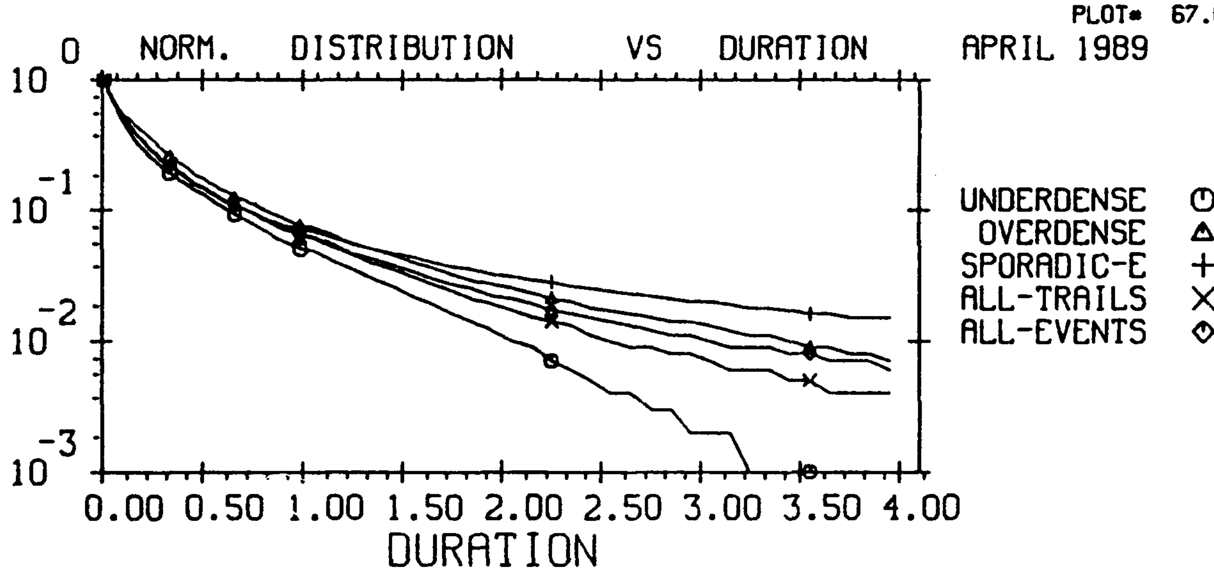
MENU=104,09-2
25-SEP-90
PLOT= 66.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER - 42159. OVER - 38834. SPOR-E - 42096.
TRAILS - 80993. EVENTS - 123089.

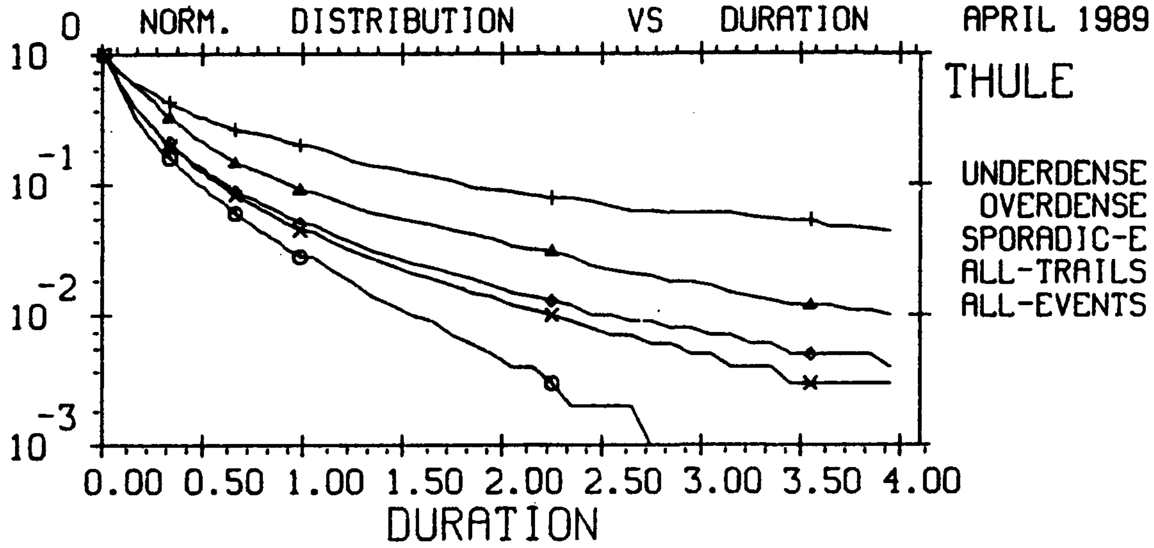
MENU*106,02-4
25-SEP-90
PLOT* 67.00




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER - 22588. OVER - 20393. SPOR-E - 14332.
TRAILS - 42981. EVENTS - 57313.

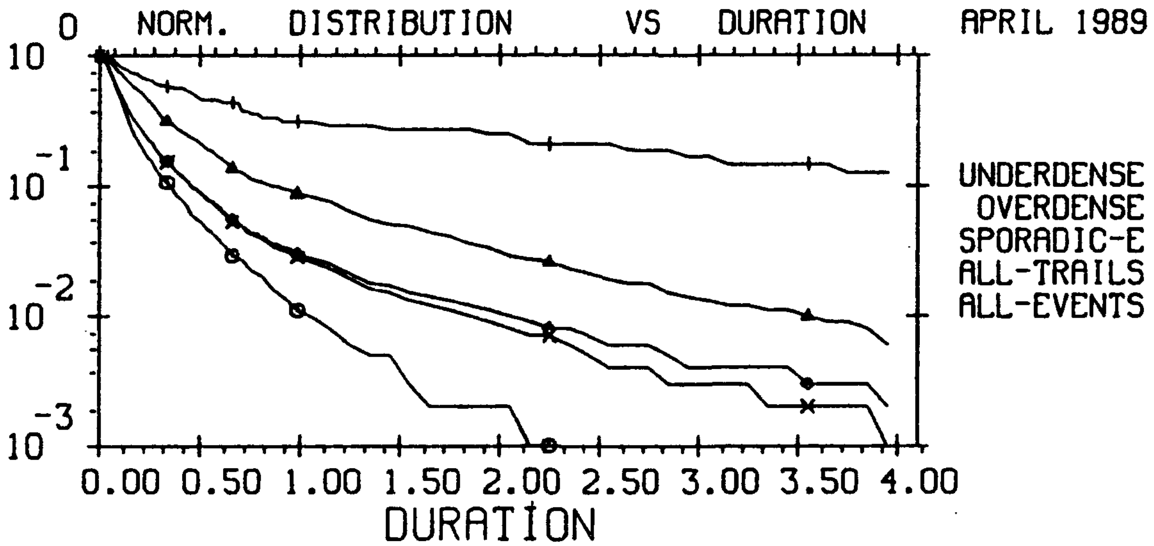
MENU*106,02-4
25-SEP-90
PLOT* 68.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER - 8072. OVER - 2819. SPOR-E - 457.
TRAILS - 10891. EVENTS - 11348.

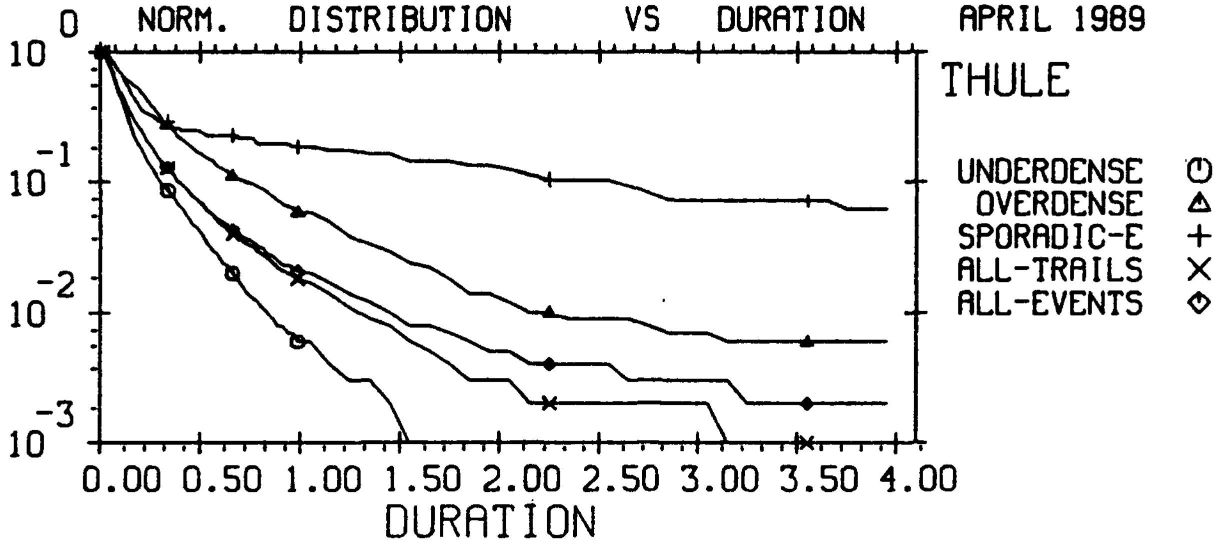
MENU=106,02-4
25-SEP-90
PLOT= 69.00




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER - 4615. OVER - 1291. SPOR-E - 48.
TRAILS - 5906. EVENTS - 5954.

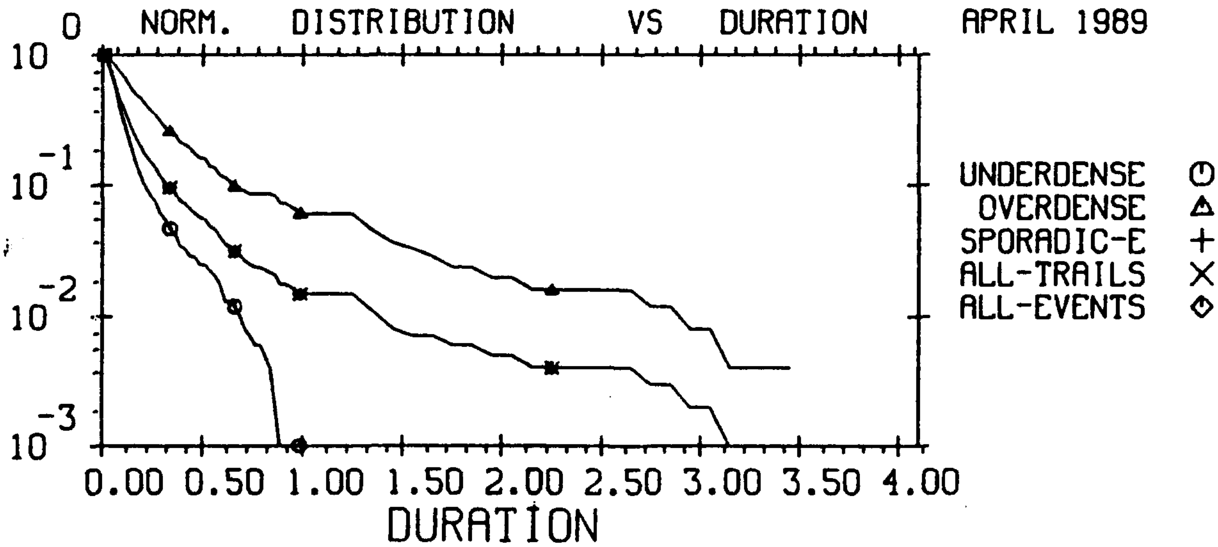
MENU=106,02-4
25-SEP-90
PLOT= 70.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER - 4499. OVER - 1247. SPOR-E - 97.
TRAILS - 5746. EVENTS - 5843.

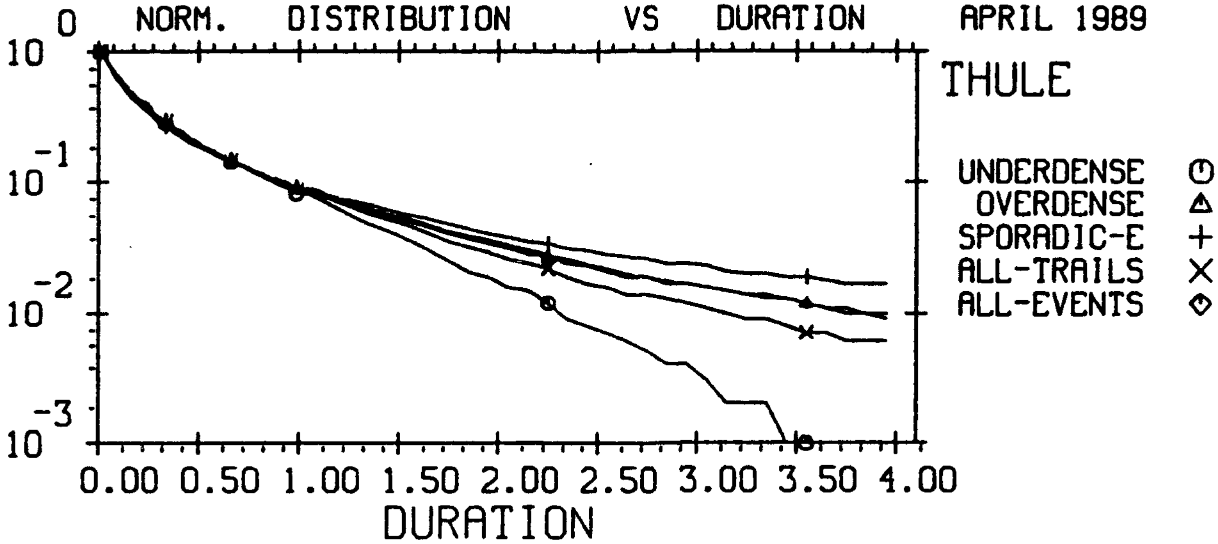
MENU=106,02-4
25-SEP-90
PLOT= 71.00




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER - 828. OVER - 245. SPOR-E - 0.
TRAILS - 1073. EVENTS - 1073.

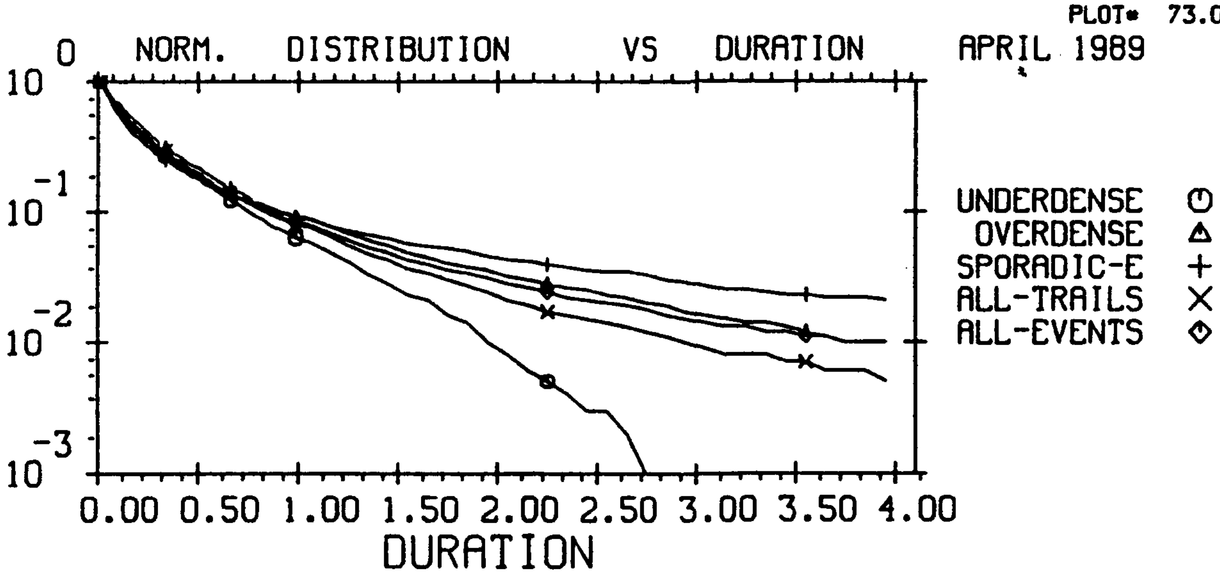
MENU=106,02-4
25-SEP-90
PLOT= 72.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER - 12663. OVER - 18351. SPOR-E - 21783.
TRAILS - 31014. EVENTS - 52797.

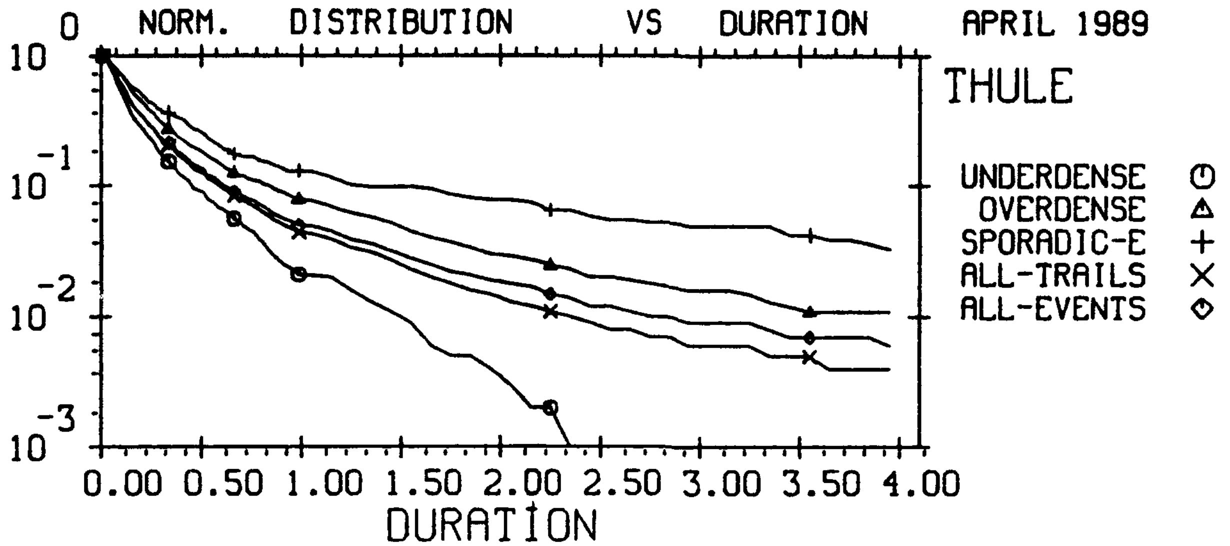
MENU=106,02-4
25-SEP-90
PLOT= 73.00




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER - 6356. OVER - 7610. SPOR-E - 5671.
TRAILS - 13966. EVENTS - 19637.

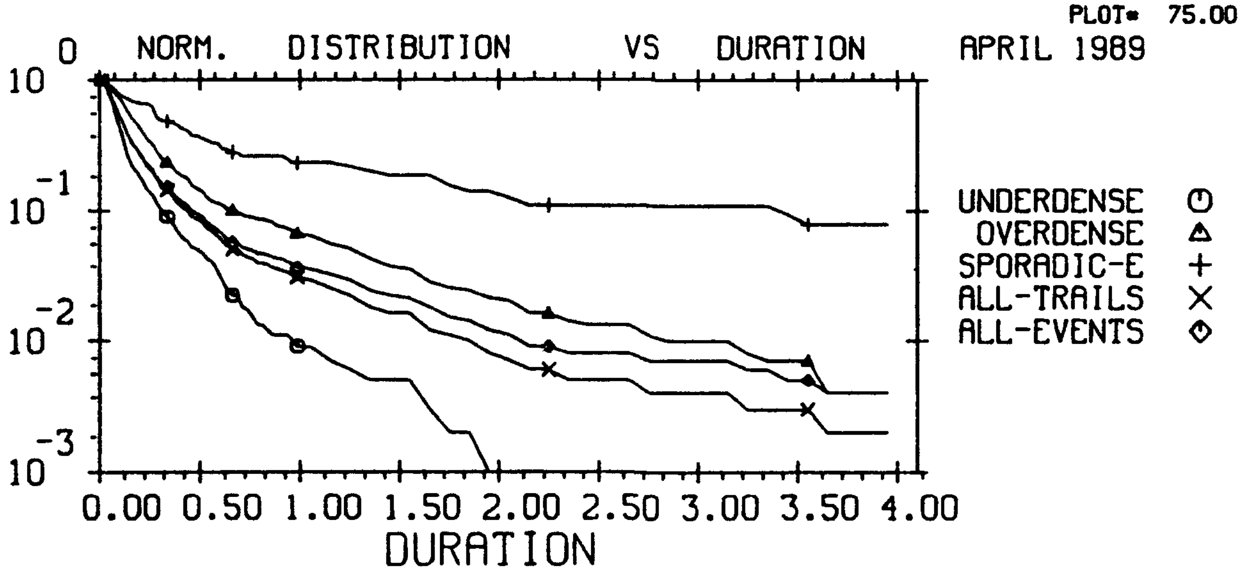
MENU=106,02-4
25-SEP-90
PLOT= 74.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER - 2407. OVER - 1578. SPOR-E - 307.
TRAILS - 3985. EVENTS - 4292.

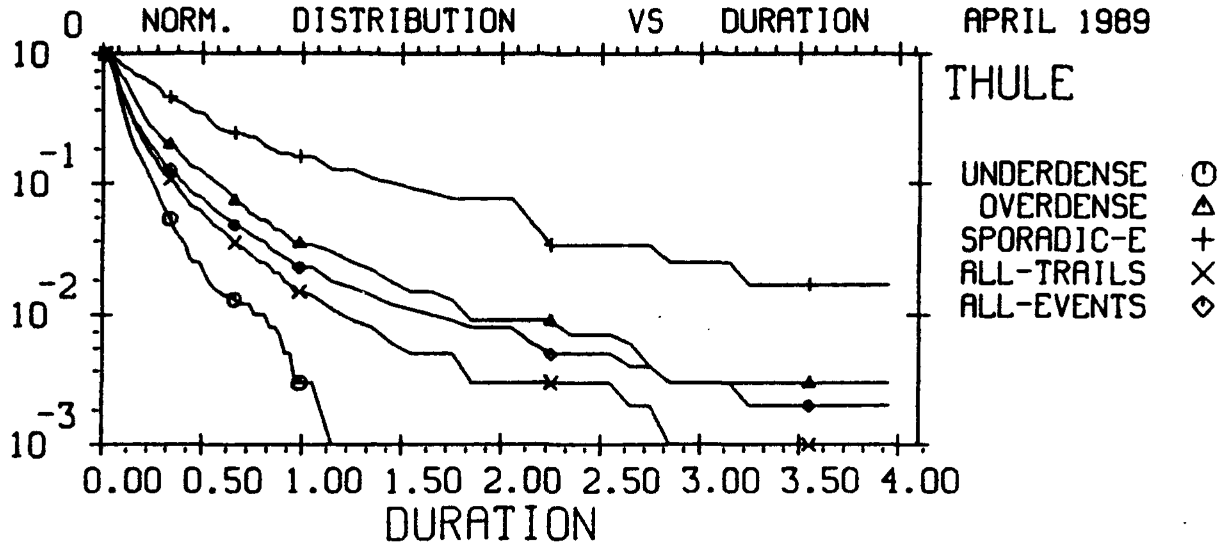
MENU=106,02-4
25-SEP-90
PLOT= 75.00




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER - 1250. OVER - 708. SPOR-E - 64.
TRAILS - 1958. EVENTS - 2022.

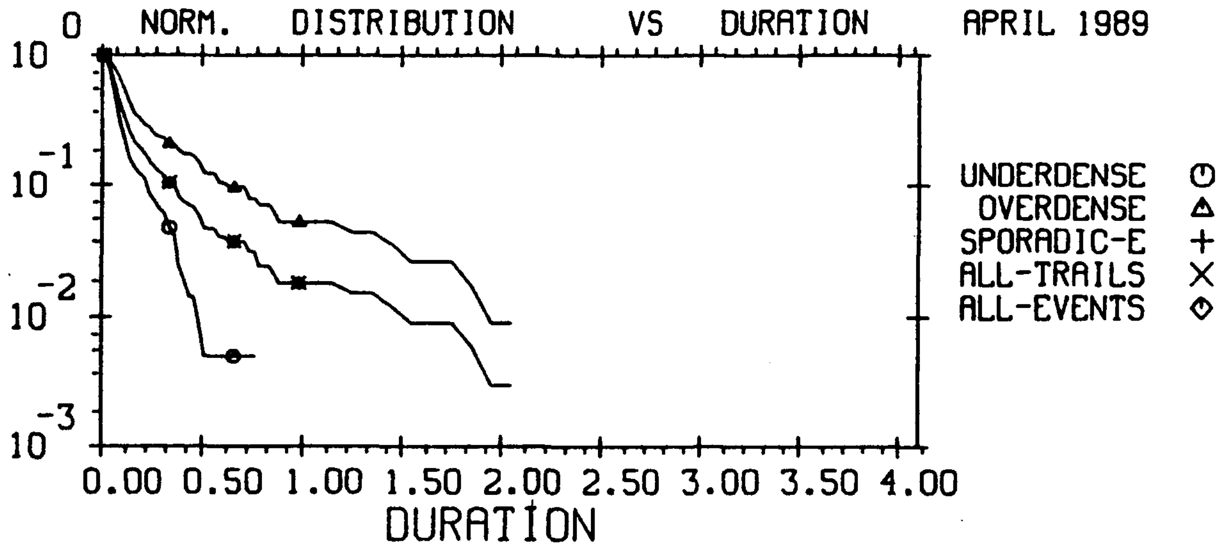
MENU=106,02-4
25-SEP-90
PLOT= 76.00

## GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER - 1175. OVER - 677. SPOR-E - 119.
TRAILS - 1852. EVENTS - 1971.

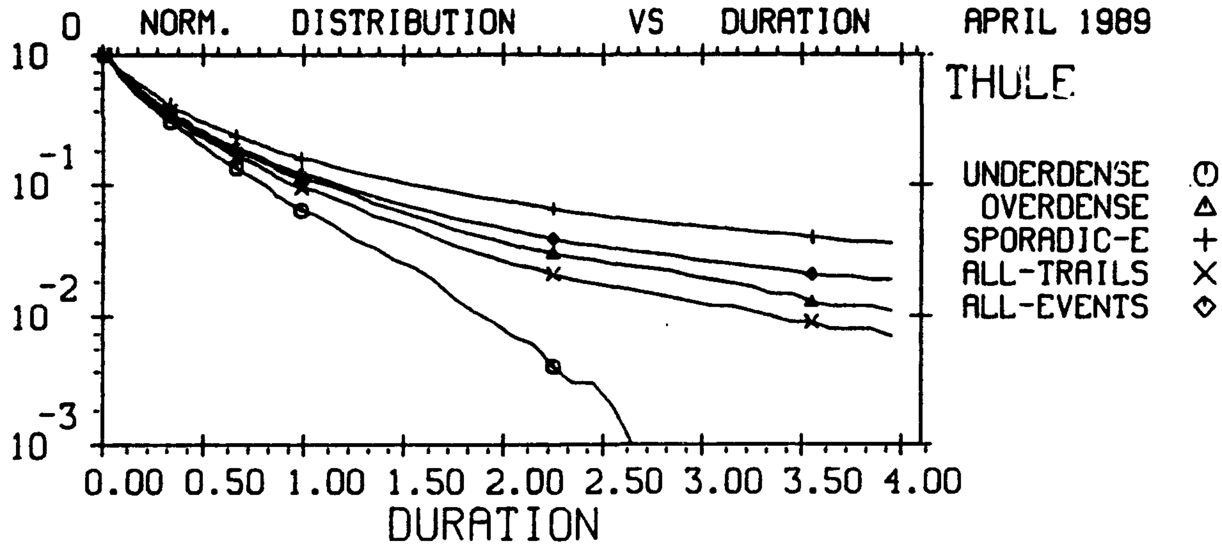
MENU=106,02-4
25-SEP-90
PLOT= 77.00




EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER - 212. OVER - 115. SPOR-E - 0.
TRAILS - 327. EVENTS - 327.

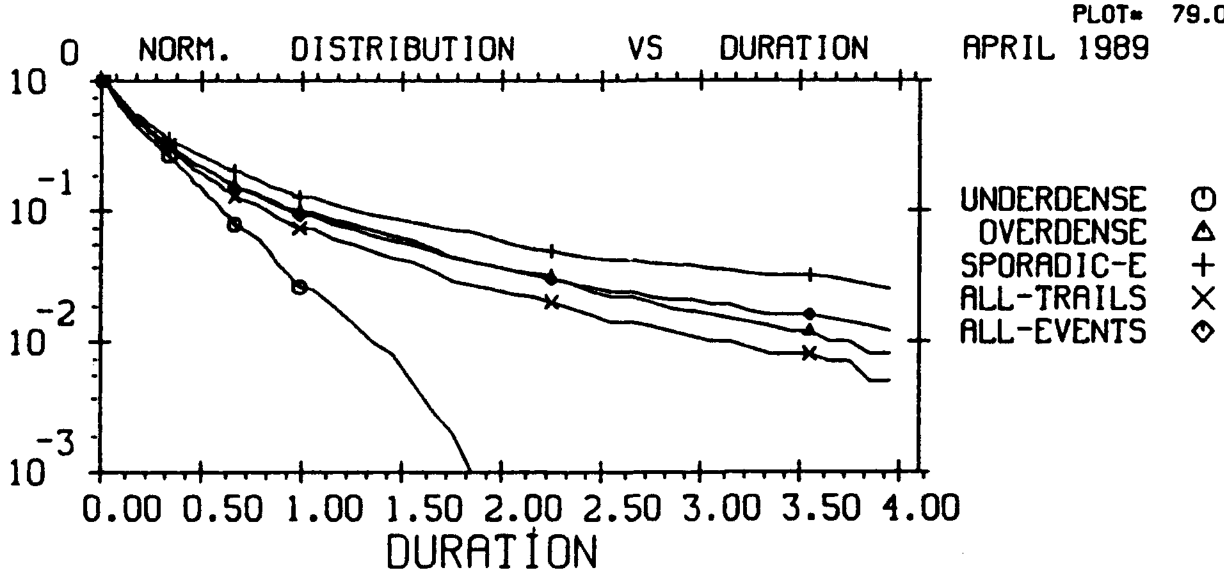
MENU=106,02-4
25-SEP-90
PLOT= 78.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER - 2440. OVER - 4452. SPOR-E - 4629.
TRAILS - 6892. EVENTS - 11521.

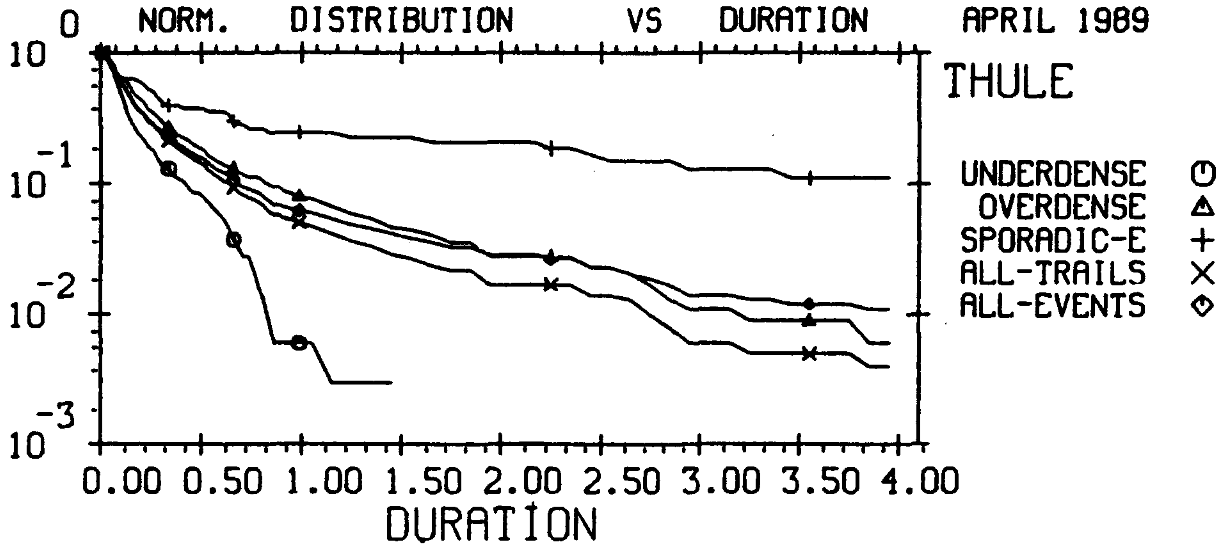
MENU=106,02-4
25-SEP-90
PLOT= 79.00




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER - 1108. OVER - 2022. SPOR-E - 1672.
TRAILS - 3130. EVENTS - 4802.

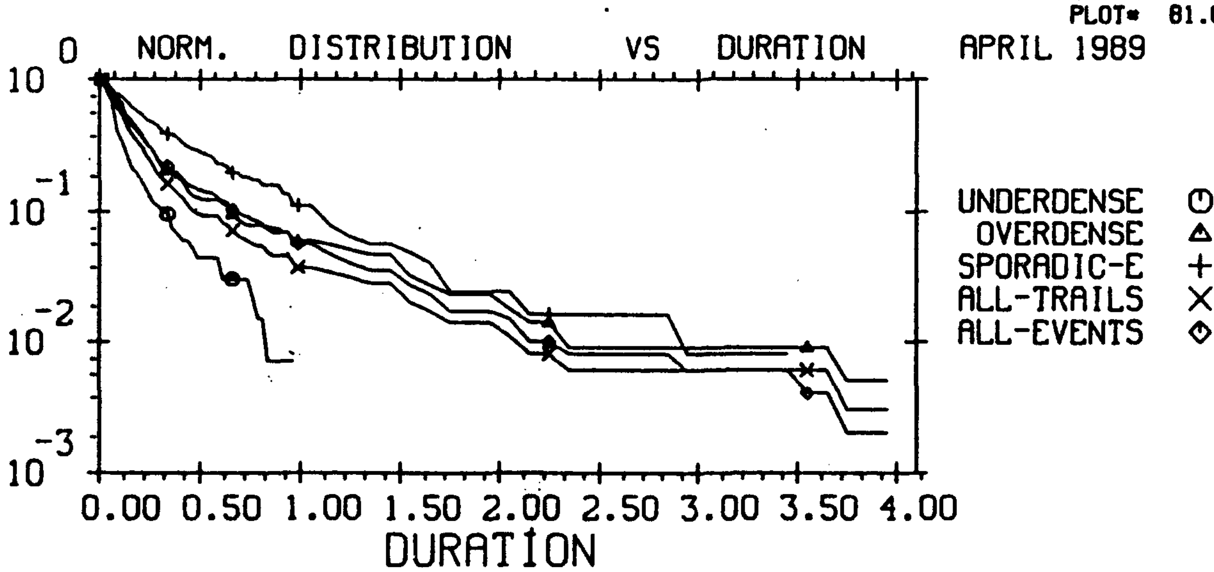
MENU=106,02-4
25-SEP-90
PLOT= 80.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER - 316. OVER - 469. SPOR-E - 54.
TRAILS - 785. EVENTS - 839.

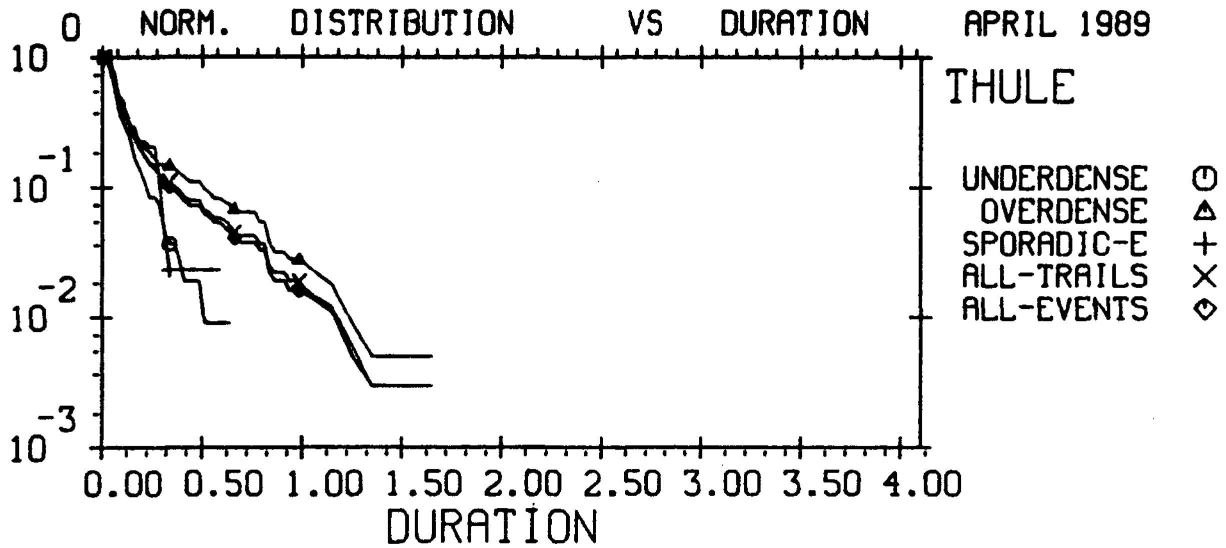
MENU=106,02-4
25-SEP-90
PLOT= 81.00




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER - 135. OVER - 219. SPOR-E - 126.
TRAILS - 354. EVENTS - 480.

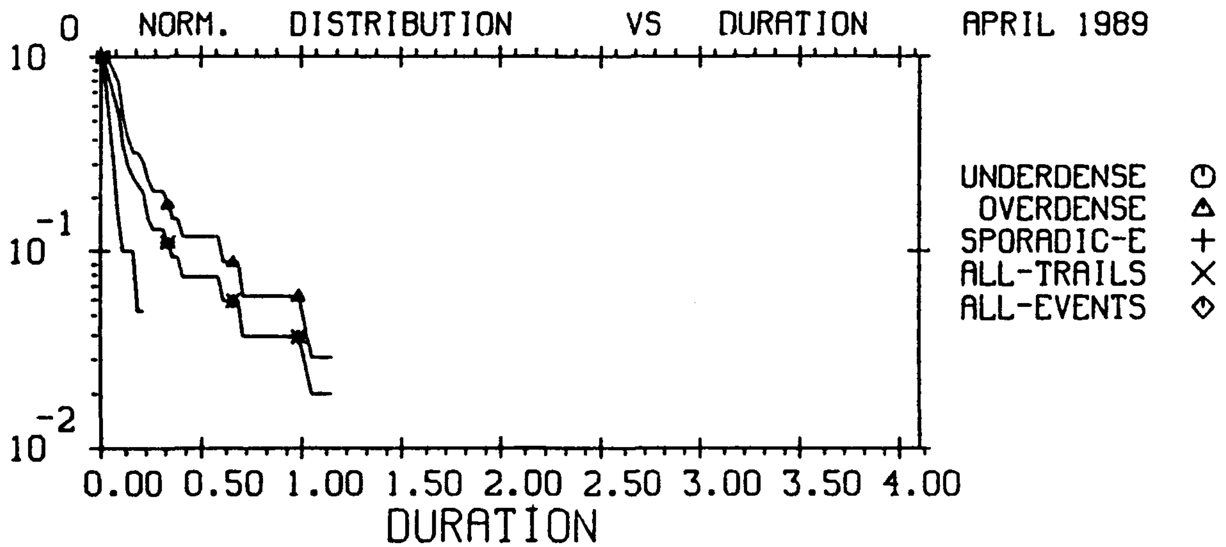
MENU=106,02-4
25-SEP-90
PLOT= 82.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER - 107. OVER - 217. SPOR-E - 44.
TRAILS - 324. EVENTS - 368.

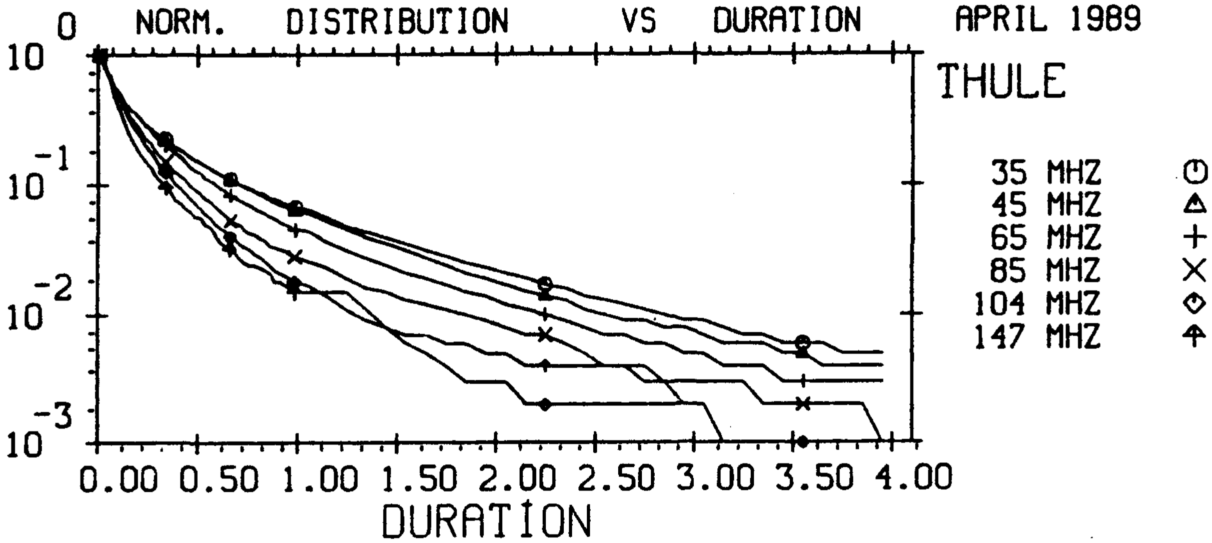
MENU*106,02-4
25-SEP-90
PLOT* 83.00




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER - 20. OVER - 34. SPOR-E - 0.
TRAILS - 54. EVENTS - 54.

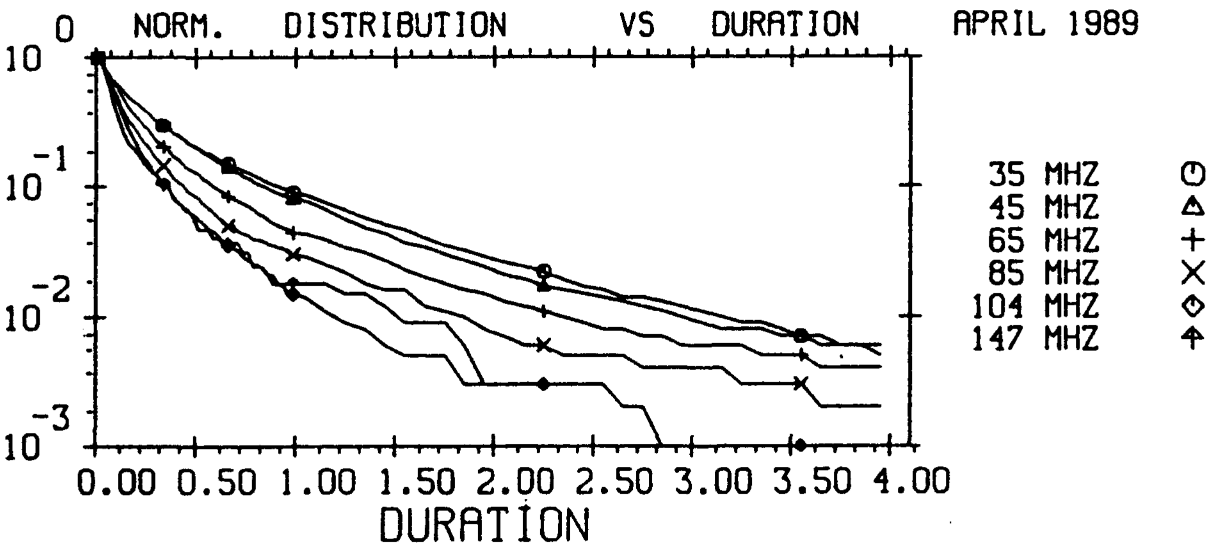
MENU*106,02-4
25-SEP-90
PLOT* 84.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING -126.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ - 80993. 45MHZ - 42981. 65MHZ - 10891.
85MHZ - 5906. 104MHZ - 5746. 147MHZ - 1073.

MENU=106,01-4
25-SEP-90
PLOT= 85.00

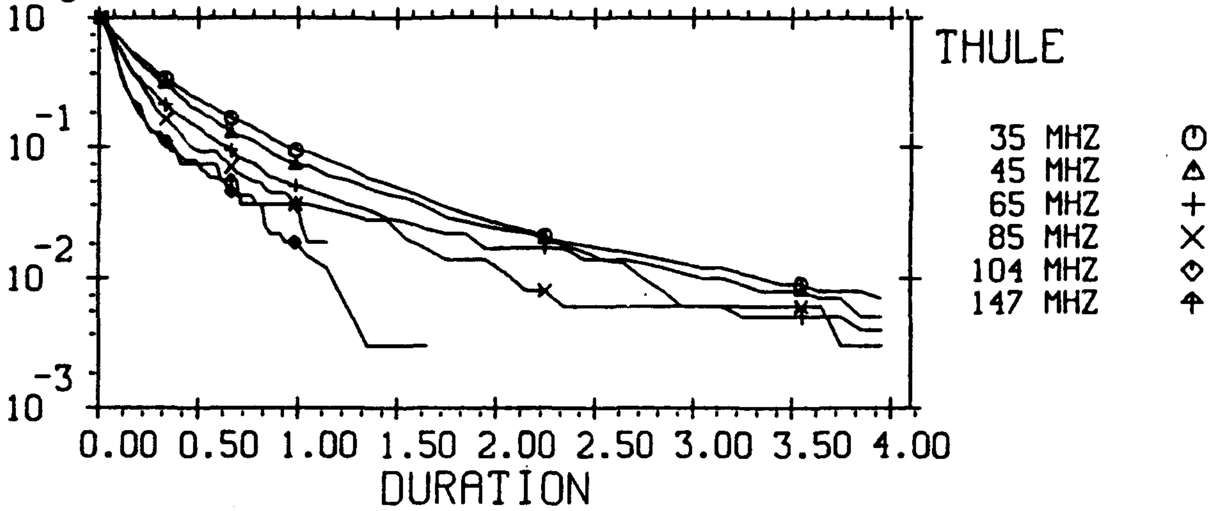



EXCEEDING -116.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ - 31014. 45MHZ - 13966. 65MHZ - 3985.
85MHZ - 1958. 104MHZ - 1852. 147MHZ - 327.

MENU=106,01-4
25-SEP-90
PLOT= 86.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

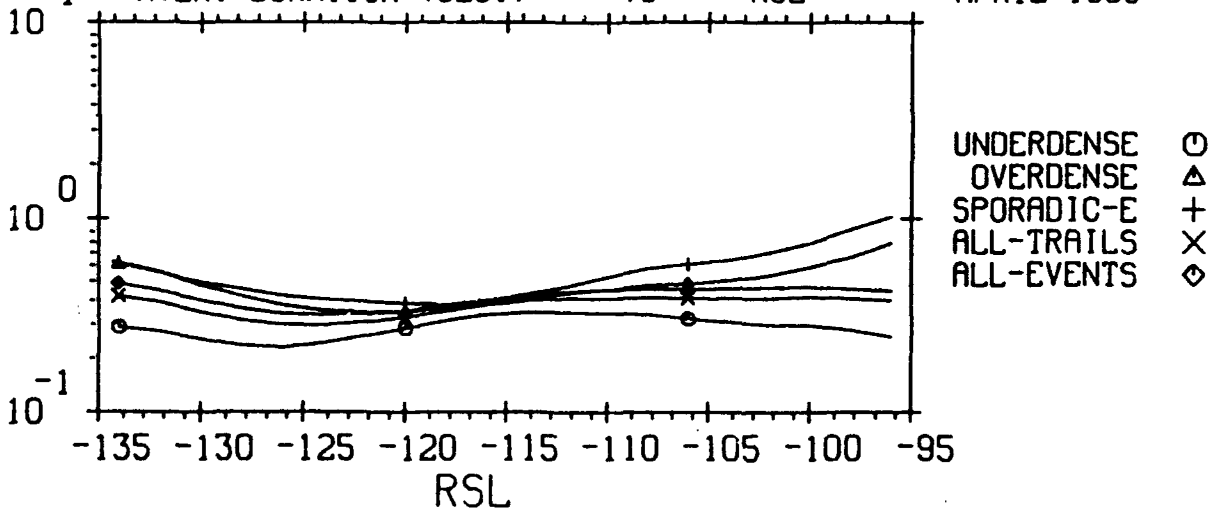
NORM. DISTRIBUTION VS DURATION APRIL 1989




EXCEEDING -106.0 DBM RSL
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ - 6892. 45MHZ - 3130. 65MHZ - 785.
85MHZ - 354. 104MHZ - 324. 147MHZ - 54.

MENU=106,01-4
25-SEP-90
PLOT= 87.00

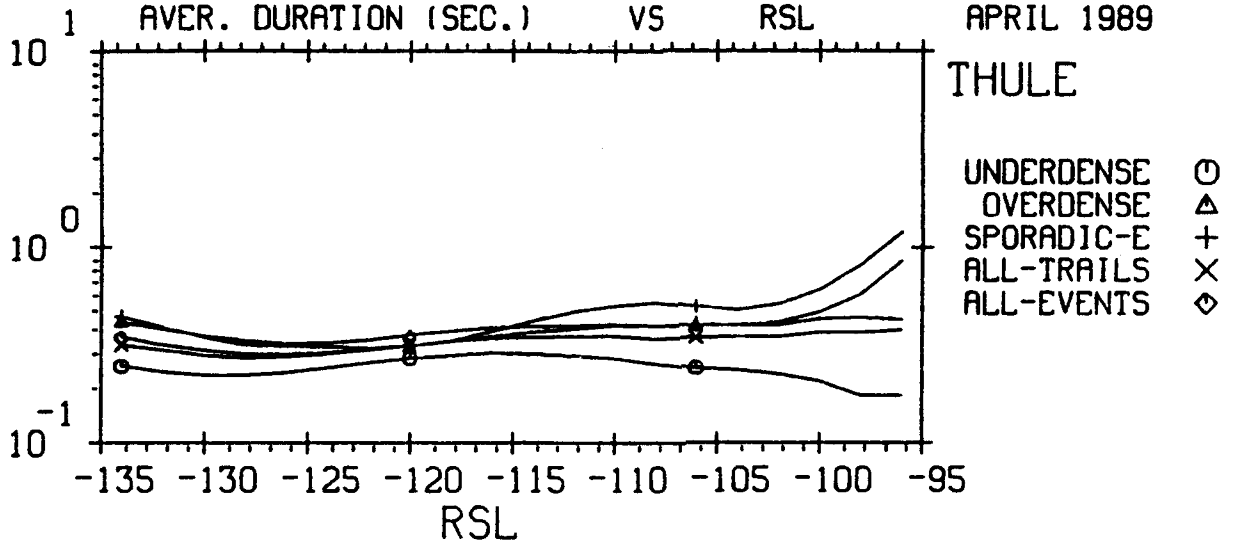
AVER. DURATION (SEC.) VS RSL APRIL 1989




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 35 MHZ

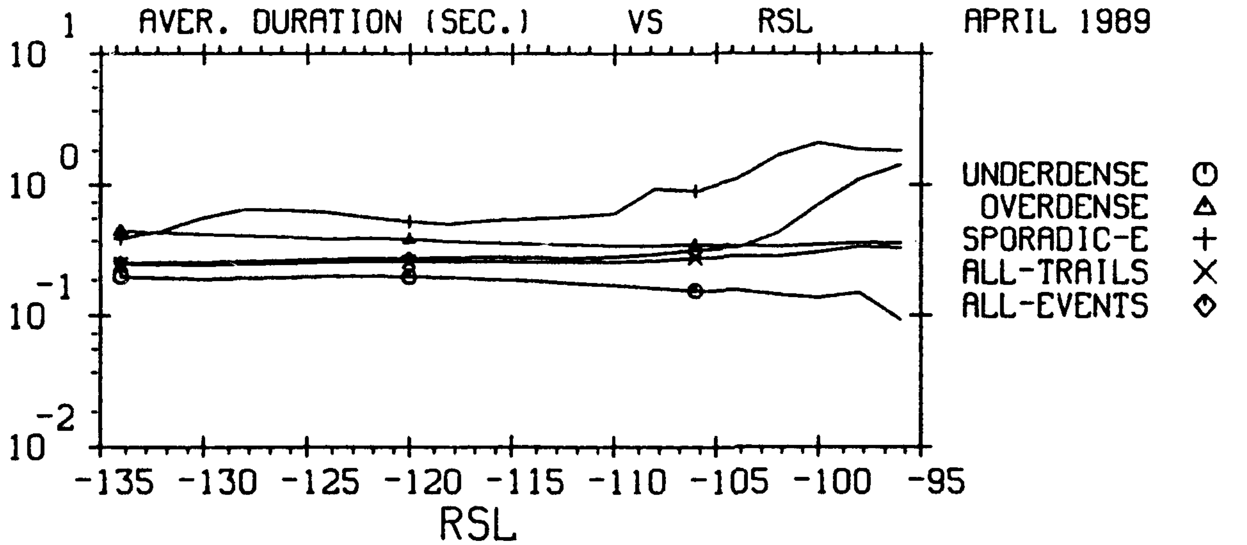
MENU=106,06-1
25-SEP-90
PLOT= 88.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 45 MHZ

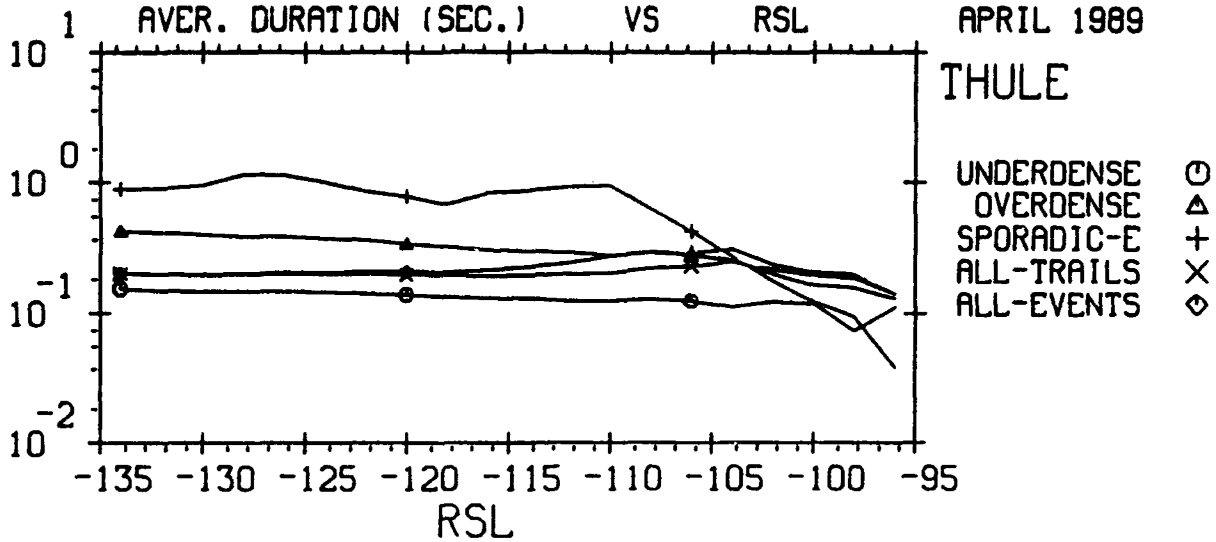
MENU=106,06-1
25-SEP-90
PLOT= 89.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 65 MHZ

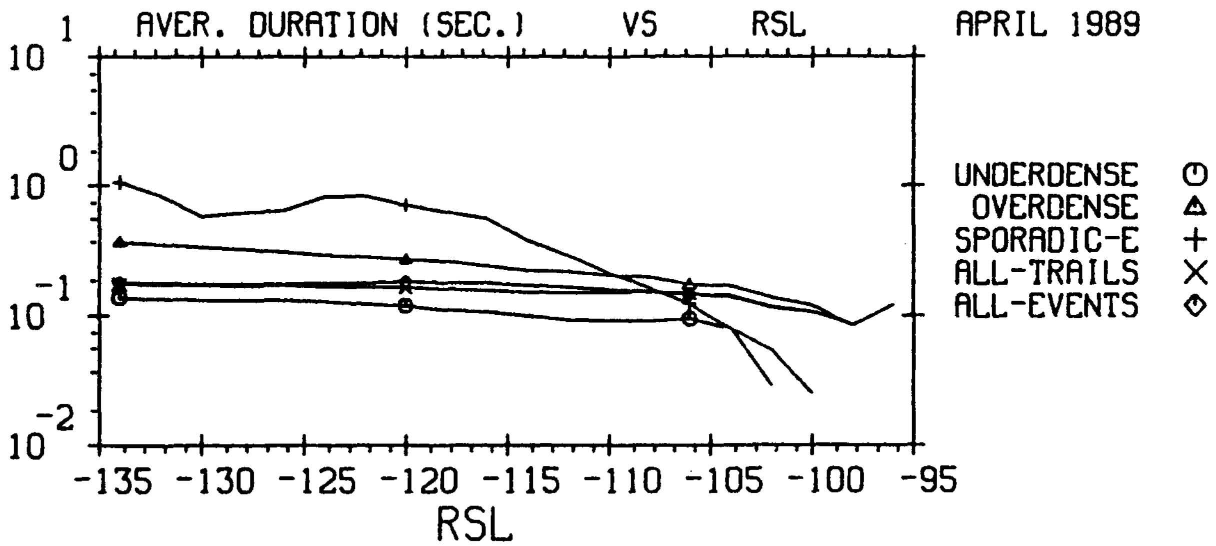
MENU=106,06-1
25-SEP-90
PLOT= 90.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM



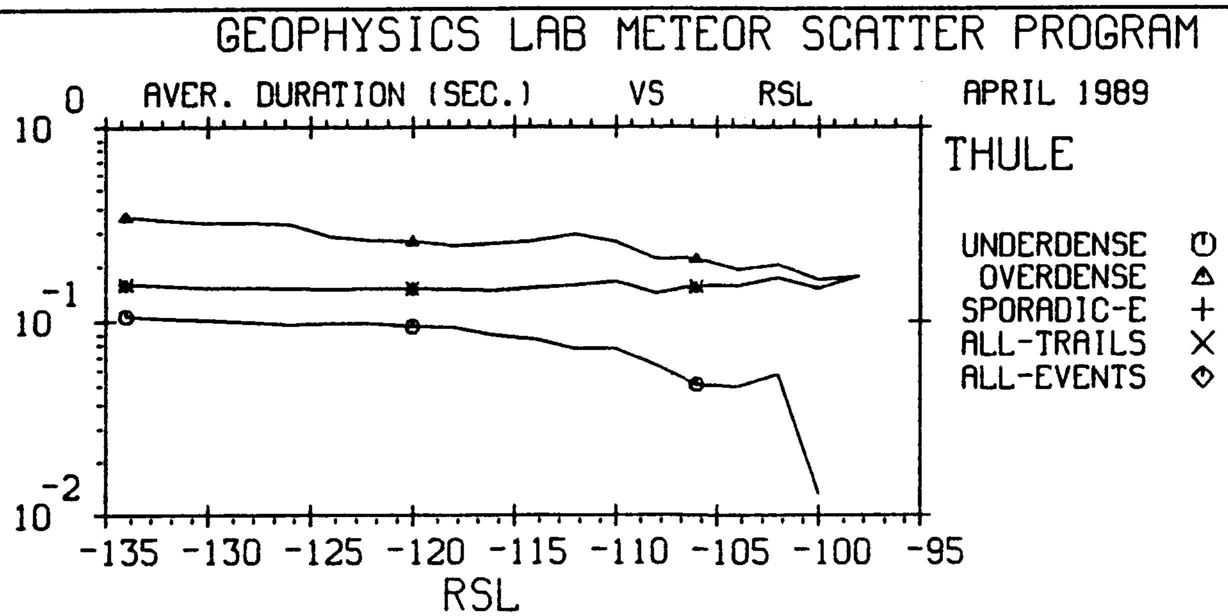

THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 85 MHZ

MENU=106,06-1
25-SEP-90
PLOT= 91.00



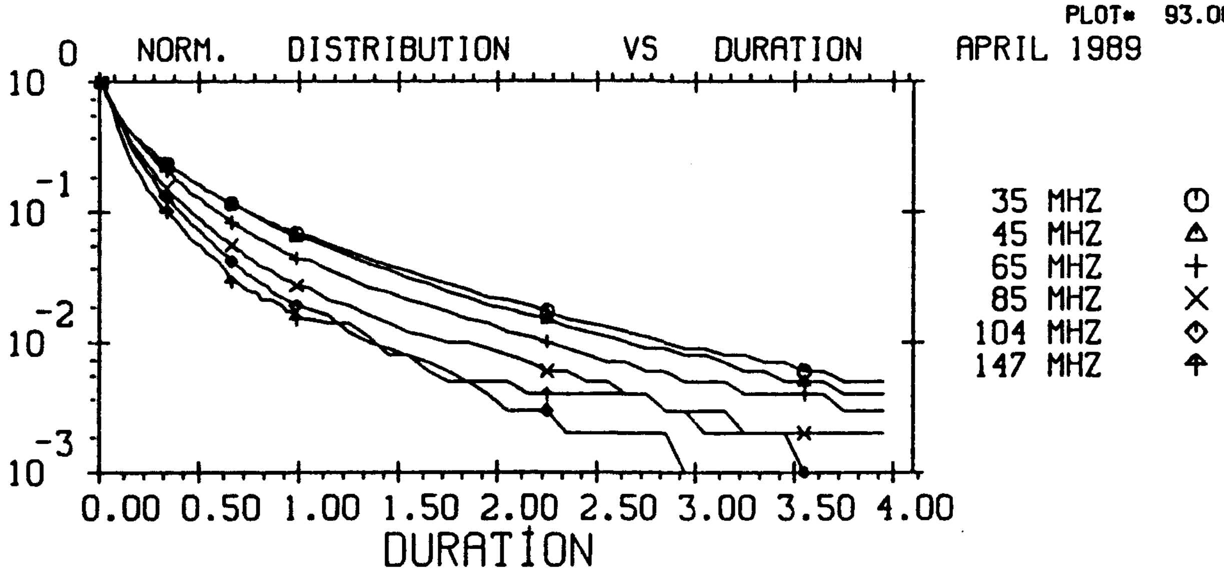

THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY - 104 MHZ

MENU=106,06-1
25-SEP-90
PLOT= 92.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
FREQUENCY = 147 MHZ

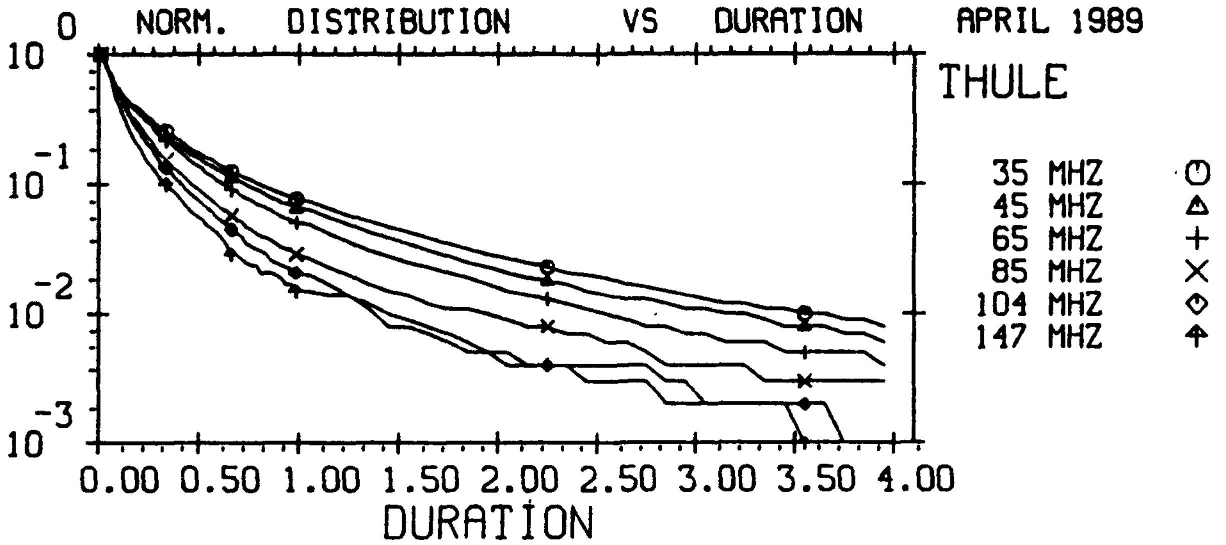
MENU=106,06-1
25-SEP-90
PLOT= 93.00




EXCEEDING 19.0 DB SNR
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH = 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL
NORMALIZING FACTORS:
35MHZ - 64090. 45MHZ - 35002. 65MHZ - 10408.
85MHZ - 6936. 104MHZ - 7671. 147MHZ - 1315.

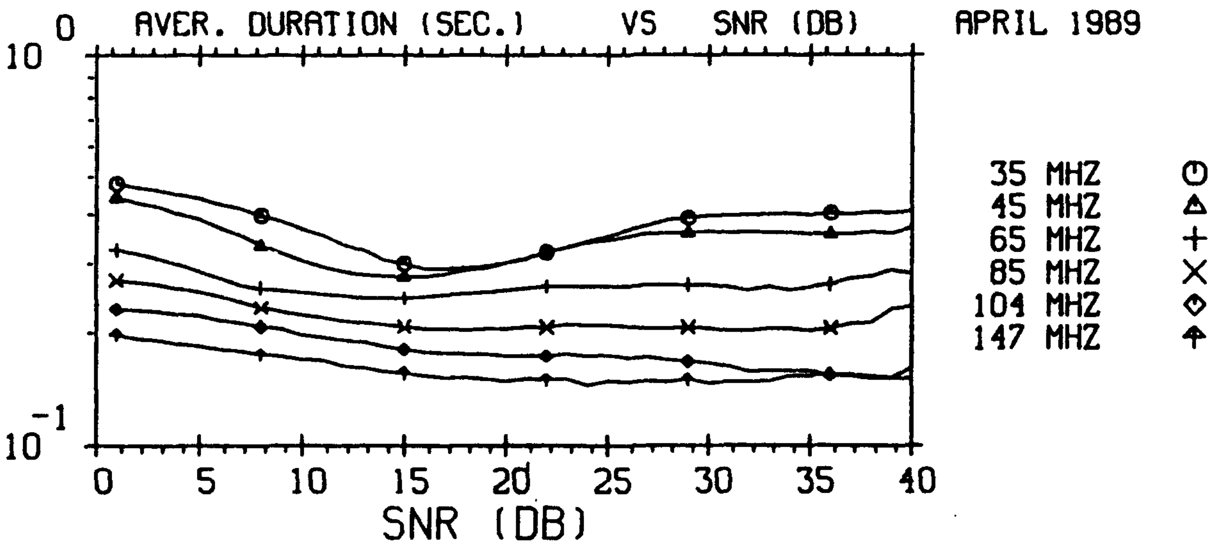
MENU=107,01-4
25-SEP-90
PLOT= 94.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




EXCEEDING 19.0 DB SNR
THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL
NORMALIZING FACTORS:
35MHZ - 101330. 45MHZ - 48020. 65MHZ - 10851.
85MHZ - 6979. 104MHZ - 7774. 147MHZ - 1315.

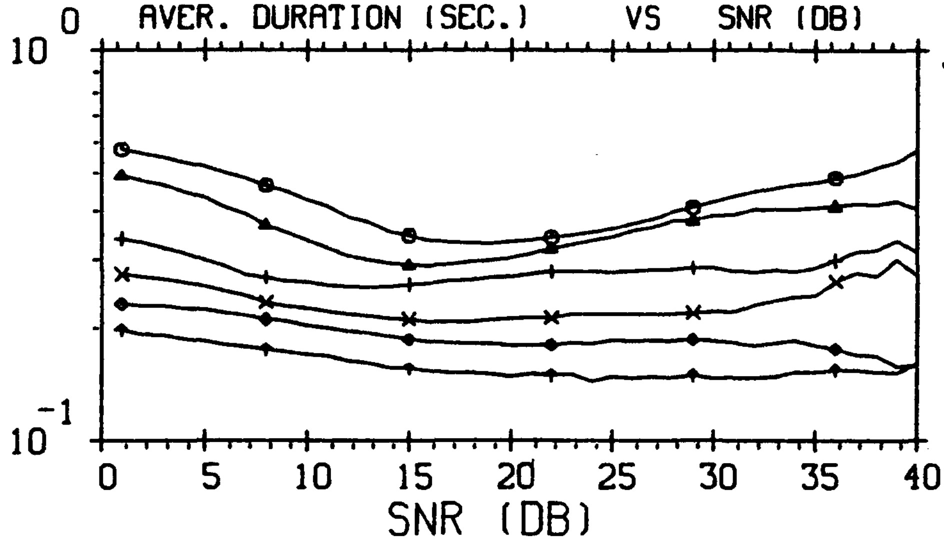
MENU=107,01-4
25-SEP-90
PLOT= 95.00




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

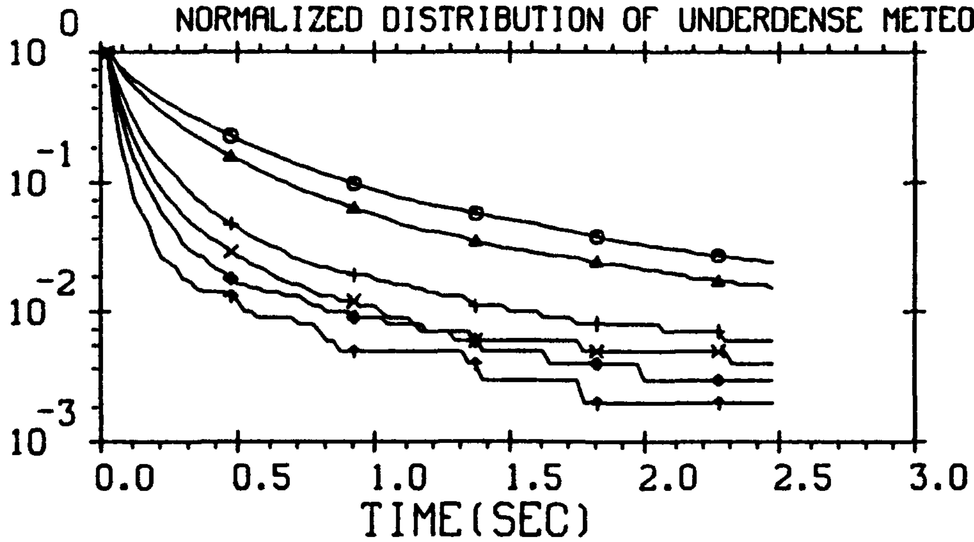
MENU=107,05-1
25-SEP-90
PLOT= 96.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 - 24 HOURS U.T.
THE EVENT CLASS IS SPORADIC-E AND METEOR TRAILS
EFFECTIVE SYSTEM BANDWIDTH - 100.HZ
BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

MENU=107,05-1
25-SEP-90
PLOT= 97.00

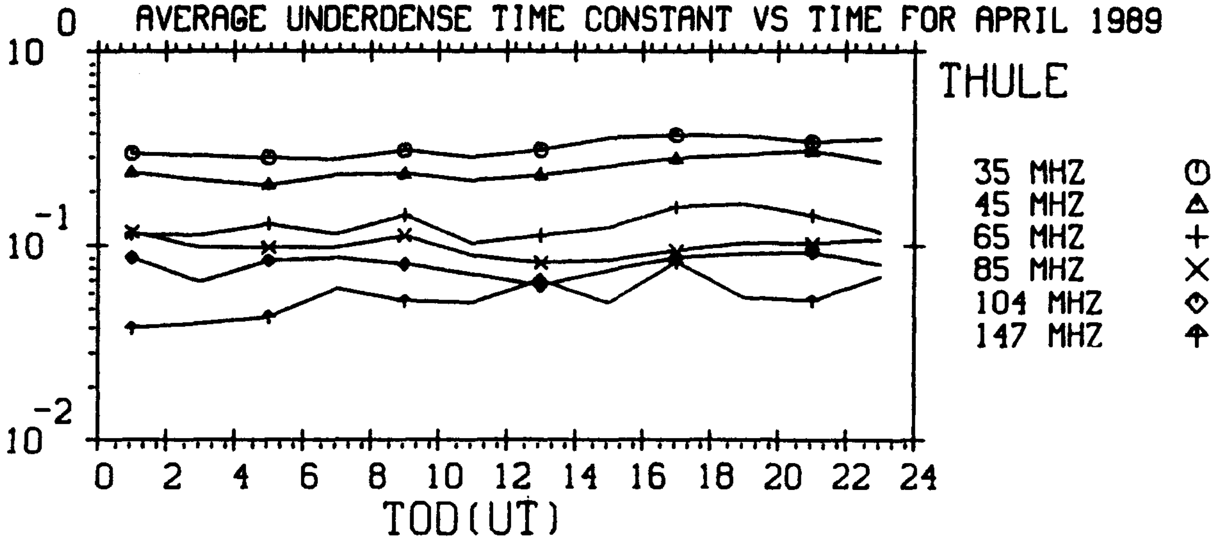



APRIL 1989
THE TIME OF DAY IS 0 : 24 HOURS U.T.
NORMALIZING FACTORS:
35MHZ : 20230. 45MHZ : 15950. 65MHZ : 9140.
85MHZ : 5871. 104MHZ : 6227. 147MHZ : 1007.

MENU=108,01-4
25-SEP-90
PLOT= 98.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM

AVERAGE UNDERDENSE TIME CONSTANT VS TIME FOR APRIL 1989

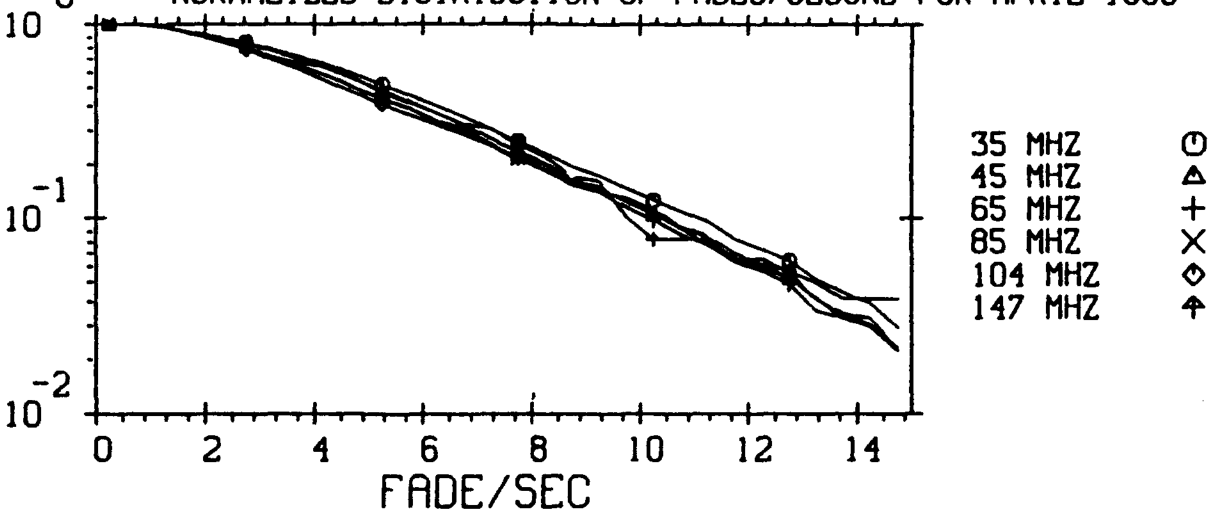



THE 24 HOUR AVERAGE TIME CONSTANTS ARE

0.315 0.248 0.127 0.096 0.079 0.056

MENU=108,02-1
25-SEP-90
PLOT= 99.00

NORMALIZED DISTRIBUTION OF FADES/SECOND FOR APRIL 1989



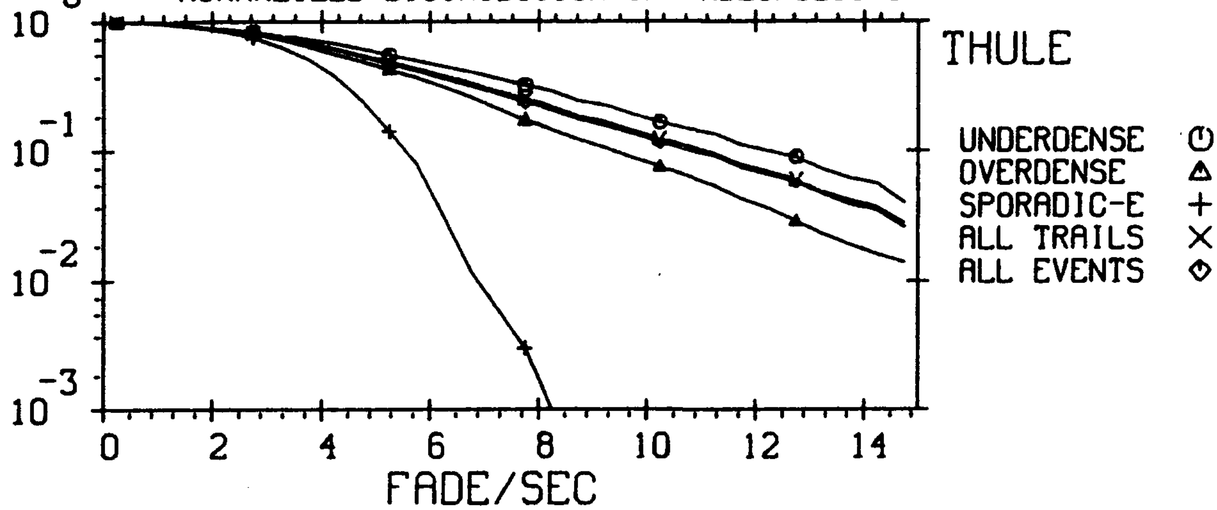

THE TIME OF DAY IS 0 : 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:

35MHZ : 22612. 45MHZ : 14413. 65MHZ : 3631.
85MHZ : 1603. 104MHZ : 1210. 147MHZ : 129.

MENU=109,01-4
25-SEP-90
PLOT= 100.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM

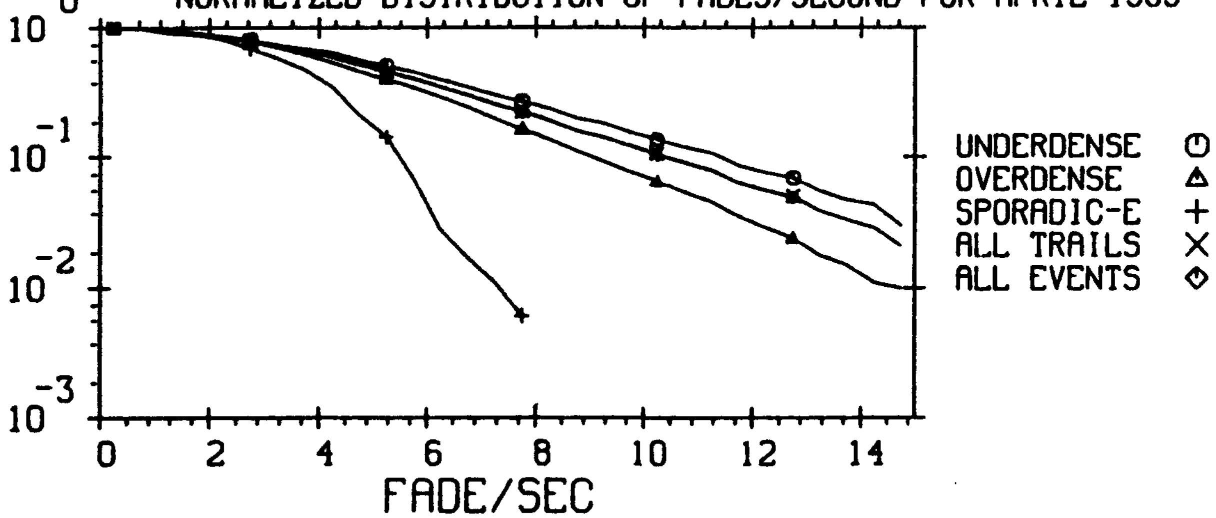
NORMALIZED DISTRIBUTION OF FADES/SECOND FOR APRIL 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER : 11906. OVER : 10706. SPOR-E : 1430.
TRAILS : 22612. EVENTS : 24042.

MENU=109,02-4
25-SEP-90
PLOT= 101.00

NORMALIZED DISTRIBUTION OF FADES/SECOND FOR APRIL 1989

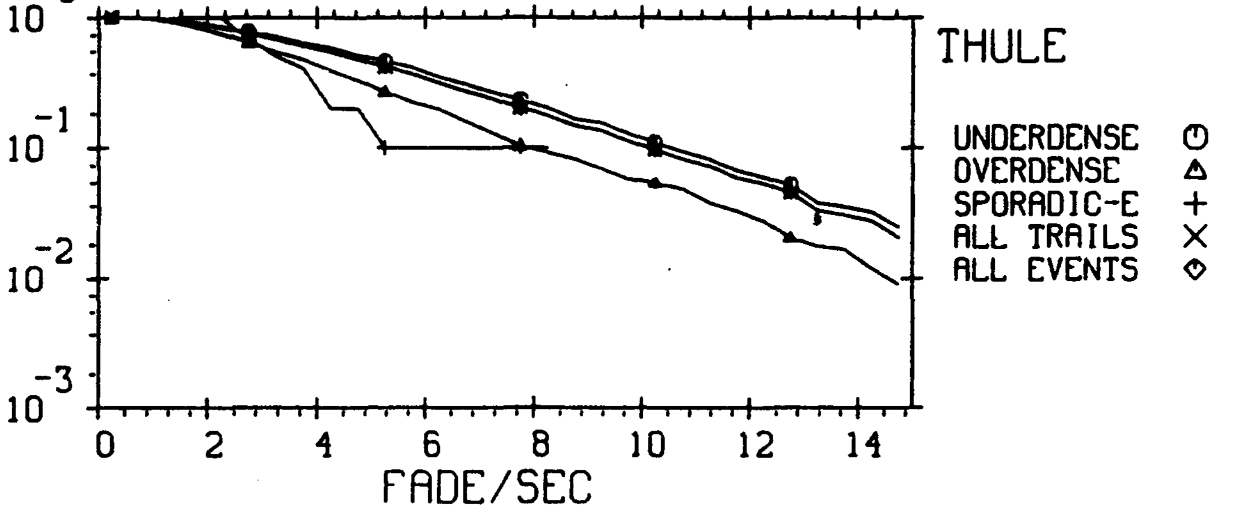



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER : 8280. OVER : 6133. SPOR-E : 176.
TRAILS : 14413. EVENTS : 14589.

MENU=109,02-4
25-SEP-90
PLOT= 102.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM

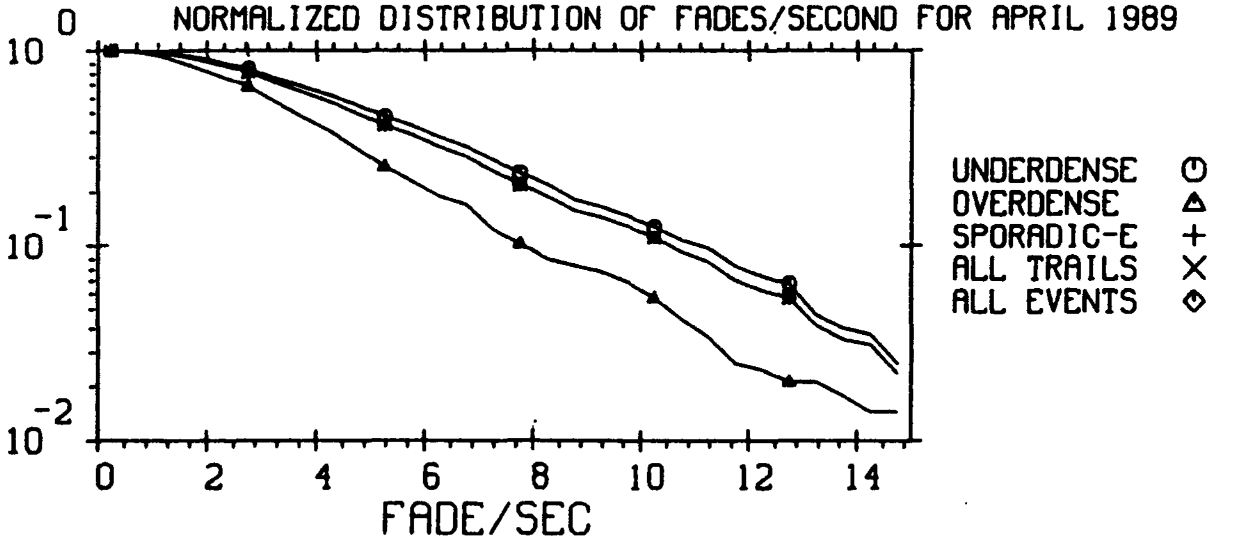
NORMALIZED DISTRIBUTION OF FADES/SECOND FOR APRIL 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER : 2788. OVER : 843. SPOR-E : 10.
TRAILS : 3631. EVENTS : 3641.

MENU=109,02-4
25-SEP-90
PLOT= 103.00

NORMALIZED DISTRIBUTION OF FADES/SECOND FOR APRIL 1989

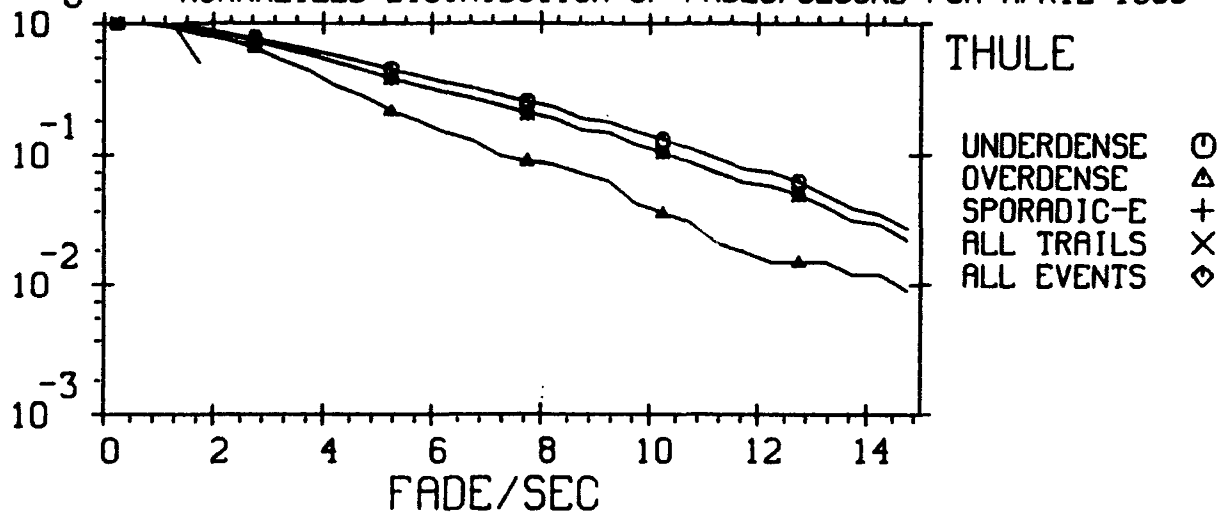



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER : 1250. OVER : 353. SPOR-E : 1.
TRAILS : 1603. EVENTS : 1604.

MENU=109,02-4
25-SEP-90
PLOT= 104.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM

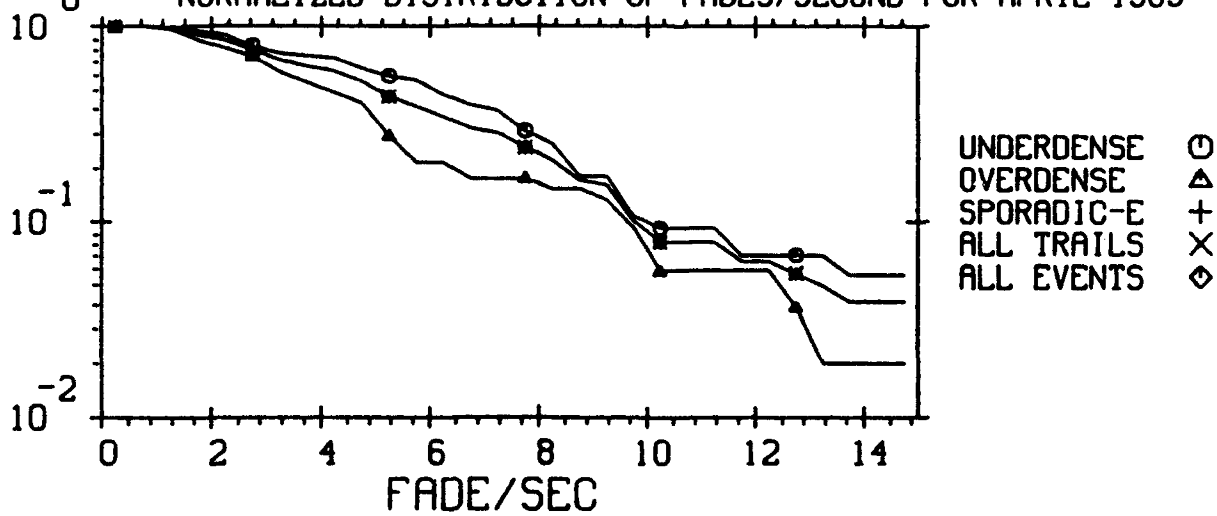
NORMALIZED DISTRIBUTION OF FADES/SECOND FOR APRIL 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER : 877. OVER : 333. SPOR-E : 2.
TRAILS : 1210. EVENTS : 1212.

MENU=109,02-4
25-SEP-90
PLOT= 105.00

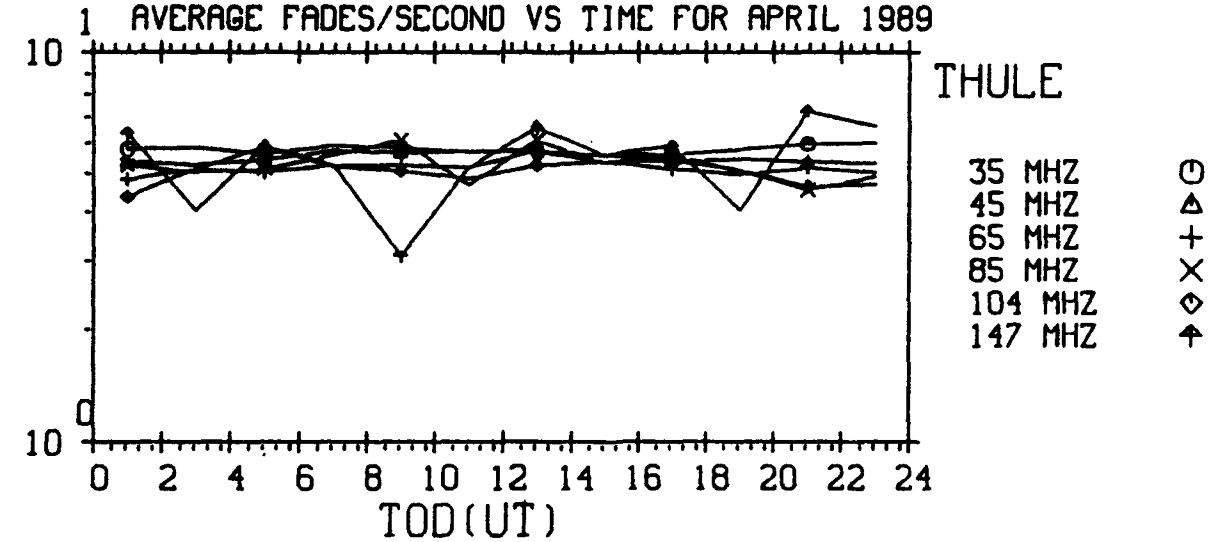
NORMALIZED DISTRIBUTION OF FADES/SECOND FOR APRIL 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER : 75. OVER : 54. SPOR-E : 1.
TRAILS : 129. EVENTS : 129.

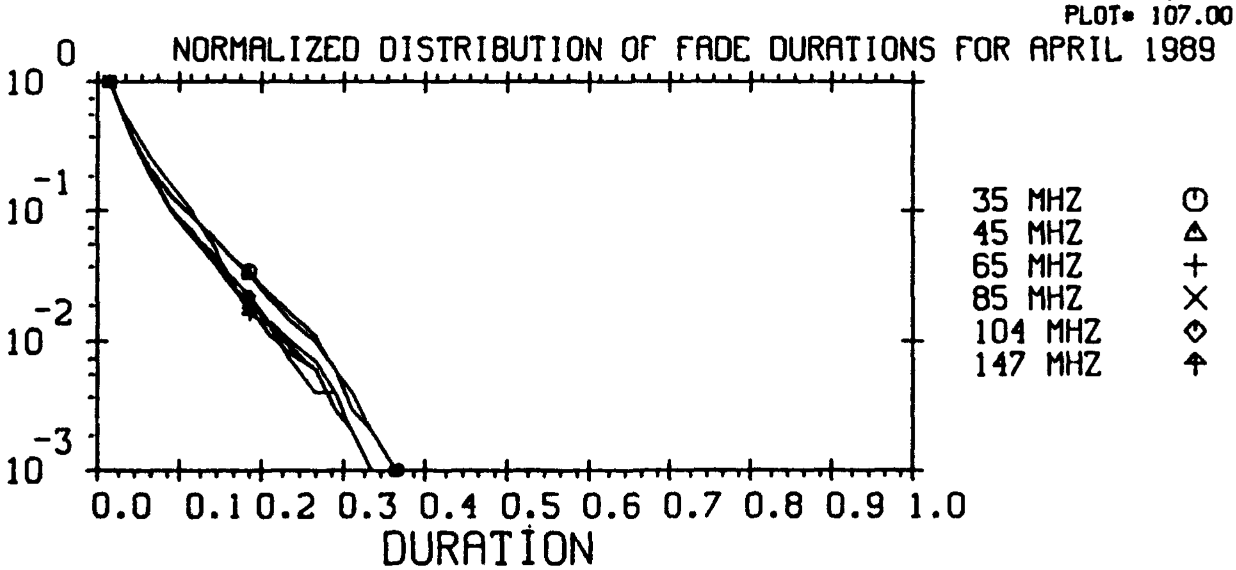
MENU=109,02-4
25-SEP-90
PLOT= 106.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
THE 24 HOUR FADES/SECOND AVERAGES ARE:
5.616 5.351 5.063 5.143 4.996 5.324

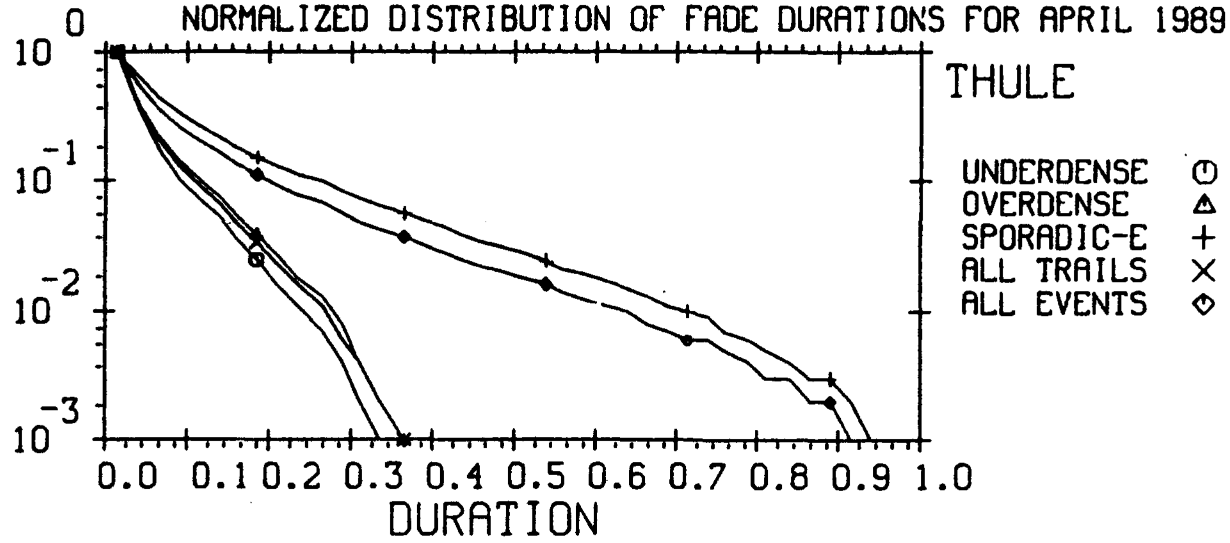
MENU=109,07-1
25-SEP-90
PLOT= 107.00




THE TIME OF DAY IS 0 : 24 HOURS U.T.
THE EVENT CLASS IS UNDERDENSE AND OVERDENSE TRAILS
NORMALIZING FACTORS:
35MHZ : 109643. 45MHZ : 65993. 65MHZ : 11260.
85MHZ : 4445. 104MHZ : 3344. 147MHZ : 555.

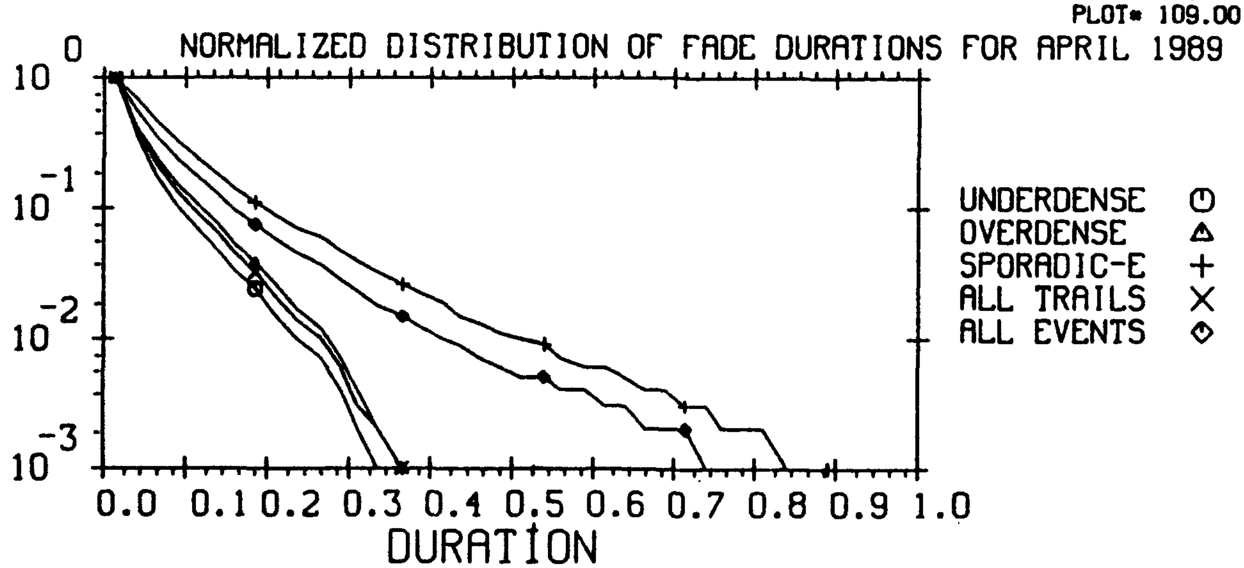
MENU=109,05-4
25-SEP-90
PLOT= 108.00

GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 35 MHZ
NORMALIZING FACTORS:
UNDER : 39071. OVER : 70572. SPOR-E : 200881.
TRAILS : 109643. EVENTS : 310524.

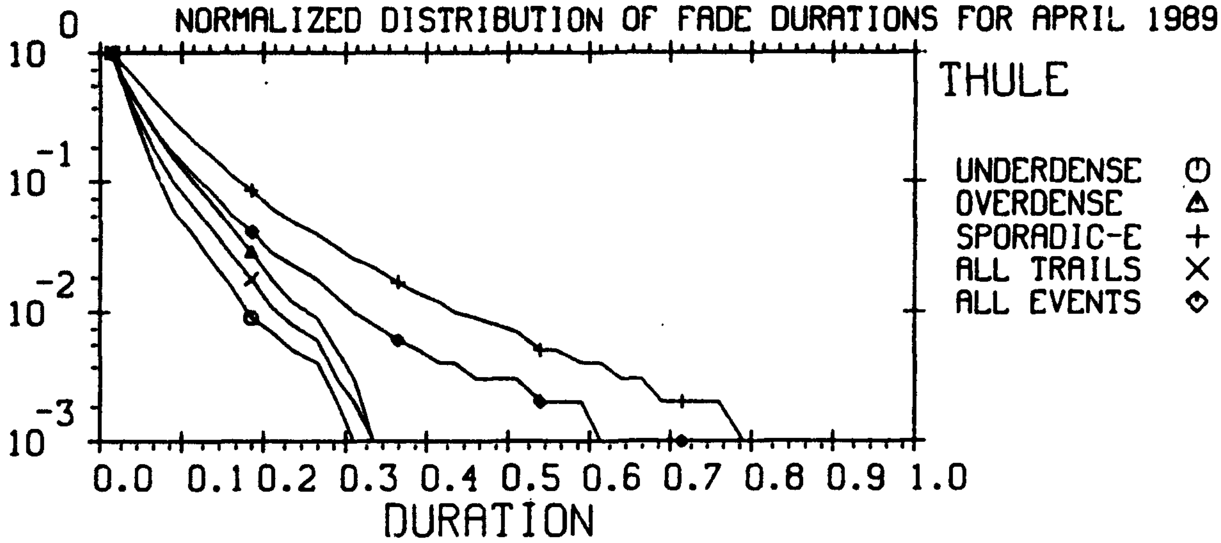
MENU=109,06-4
25-SEP-90
PLOT= 109.00




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 45 MHZ
NORMALIZING FACTORS:
UNDER : 26599. OVER : 39394. SPOR-E : 80349.
TRAILS : 65993. EVENTS : 146342.

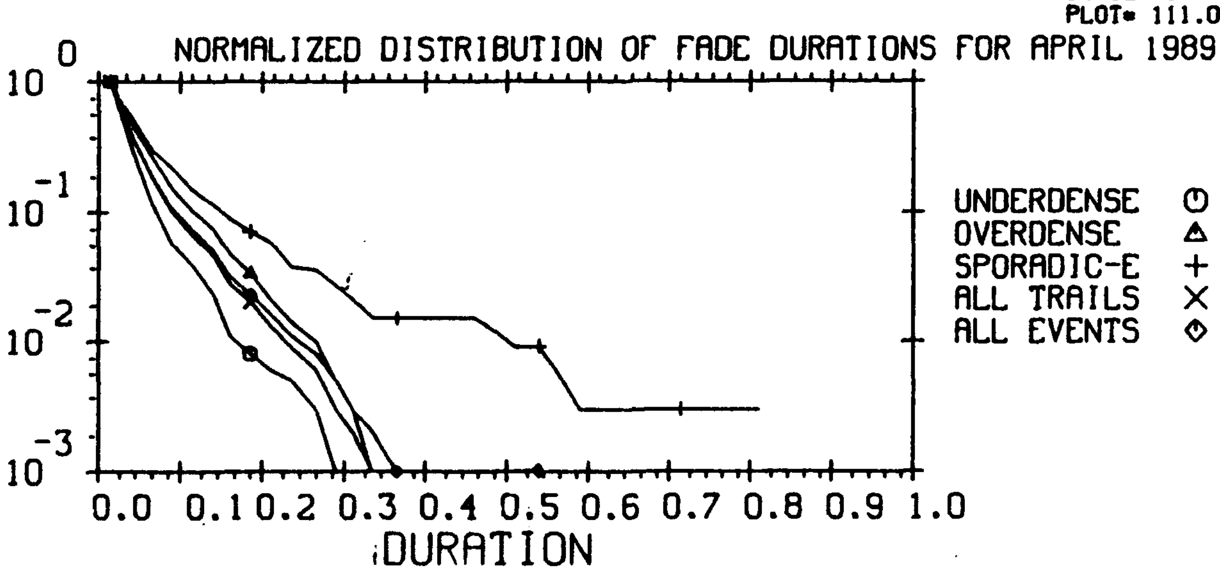
MENU=109,06-4
25-SEP-90
PLOT= 110.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 65 MHZ
NORMALIZING FACTORS:
UNDER : 6545. OVER : 4715. SPOR-E : 6007.
TRAILS : 11260. EVENTS : 17267.

MENU=109,06-4
25-SEP-90
PLOT= 111.00

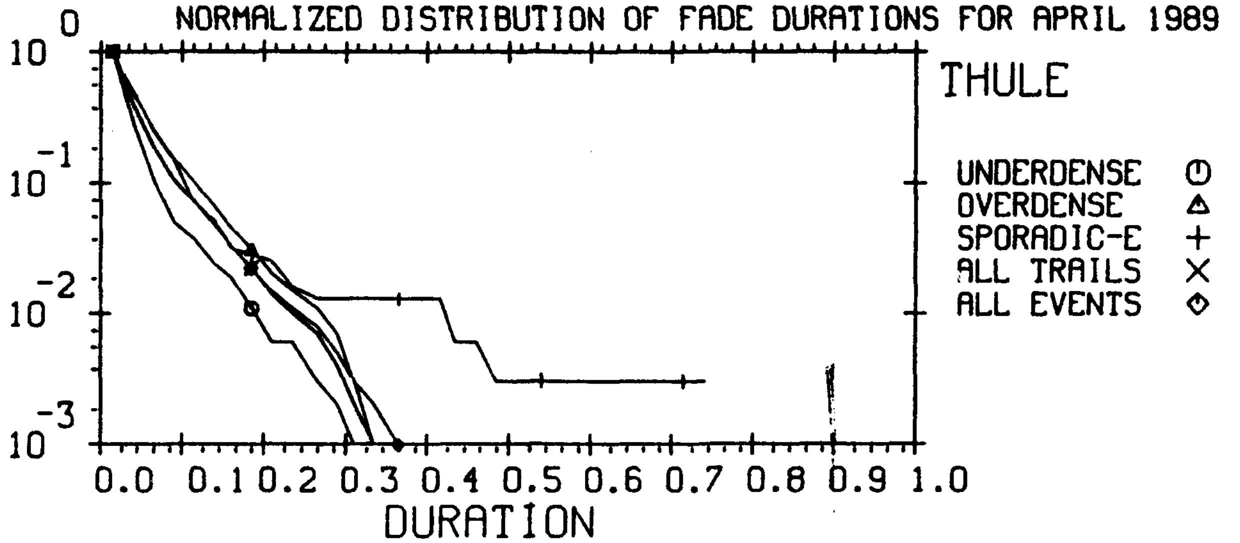



THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 85 MHZ
NORMALIZING FACTORS:
UNDER : 2441. OVER : 2004. SPOR-E : 338.
TRAILS : 4445. EVENTS : 4783.

MENU=109,06-4
25-SEP-90
PLOT= 112.00

## GEOPHYSICS LAB METEOR SCATTER PROGRAM

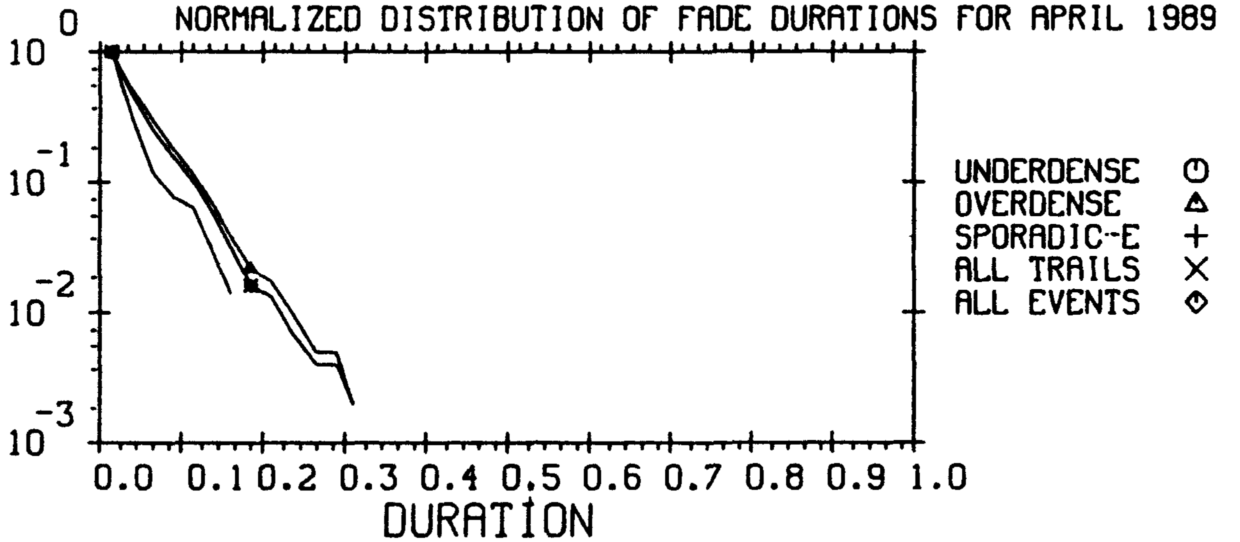
NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR APRIL 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 104 MHZ
NORMALIZING FACTORS:
UNDER : 1566. OVER : 1778. SPOR-E : 316.
TRAILS : 3344. EVENTS : 3660.

MENU=109,06-4
25-SEP-90
PLOT= 113.00

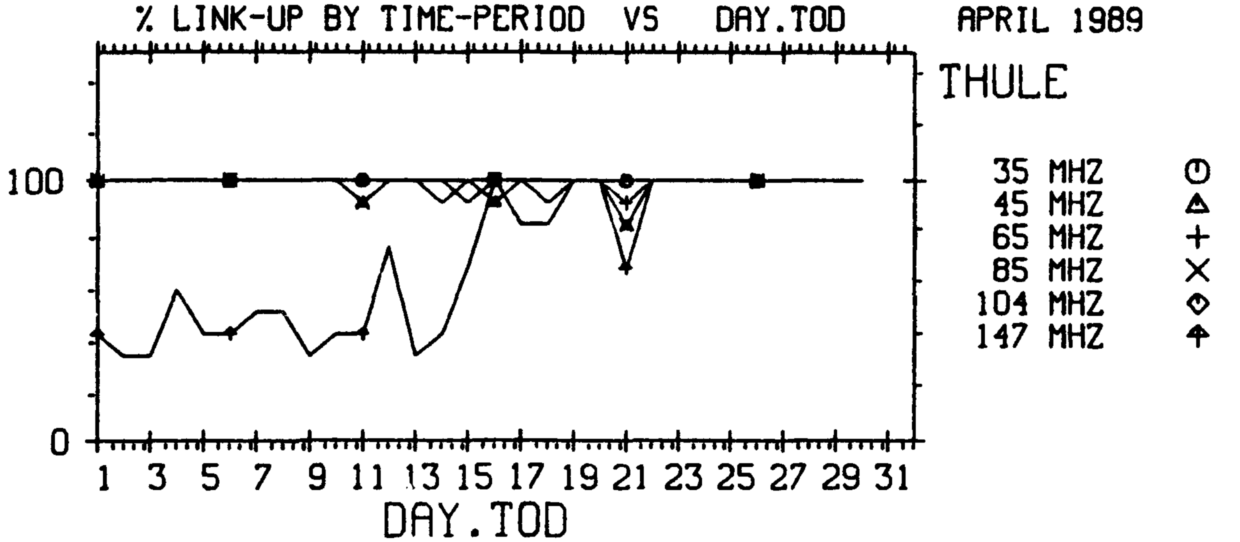
NORMALIZED DISTRIBUTION OF FADE DURATIONS FOR APRIL 1989




THE TIME OF DAY IS 0 : 24 HOURS U.T.
FREQUENCY - 147 MHZ
NORMALIZING FACTORS:
UNDER : 142. OVER : 413. SPOR-E : 1.
TRAILS : 555. EVENTS : 555.

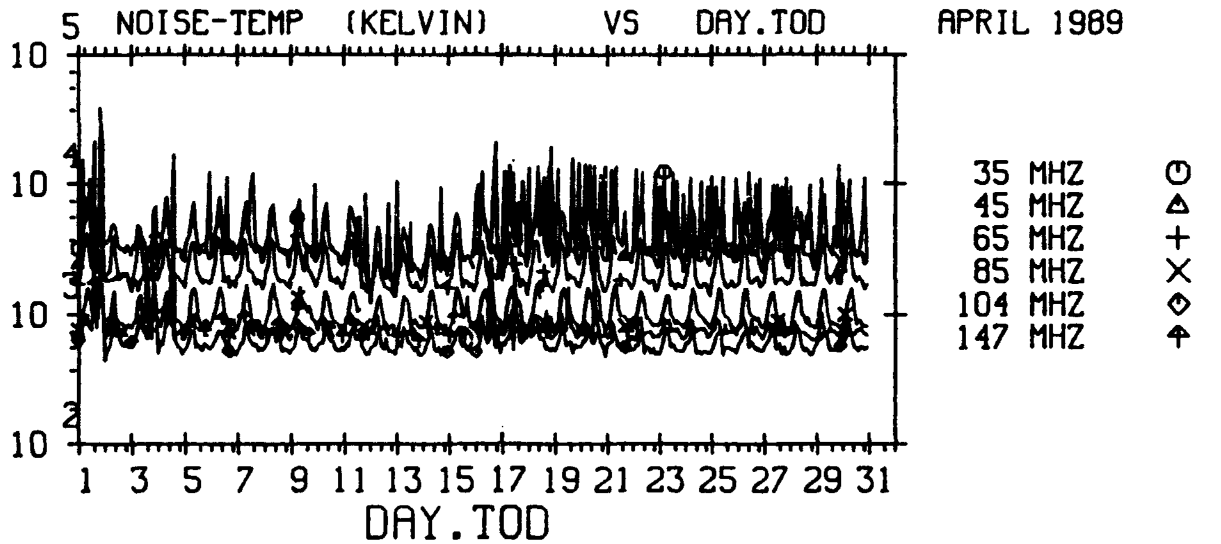
MENU=109,06-4
25-SEP-90
PLOT= 114.00

# GEOPHYSICS LAB METEOR SCATTER PROGRAM



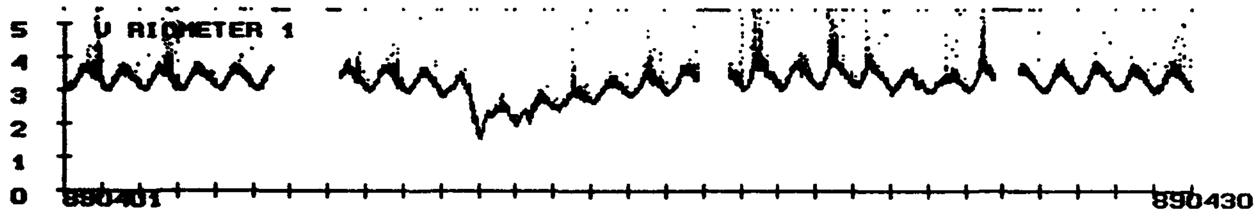

BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

MENU=105,01-1
25-SEP-90
PLOT= 115.00



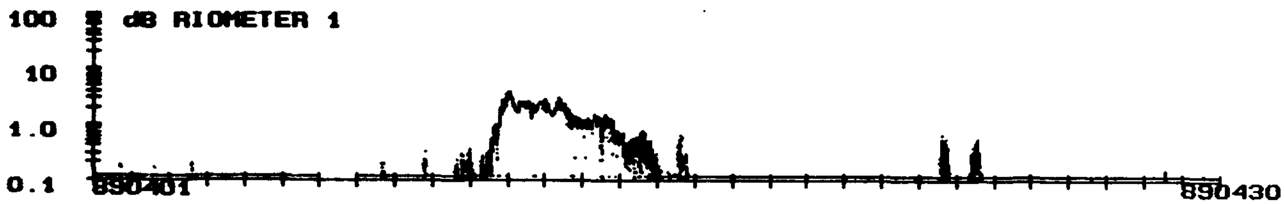

BASED ON OBSERVED NOISE MEASUREMENTS - VERTICAL

MENU=105,06-1
25-SEP-90
PLOT= 116.00



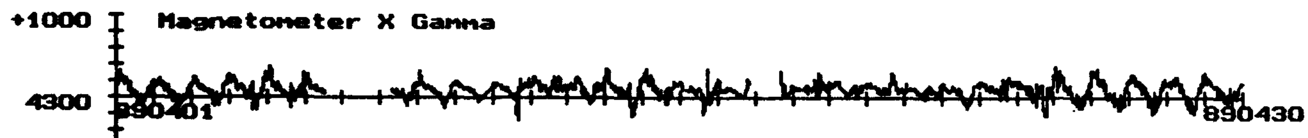

PLOT 117

PLOT 118 RIOMETER 2 DATA UNAVAILABLE

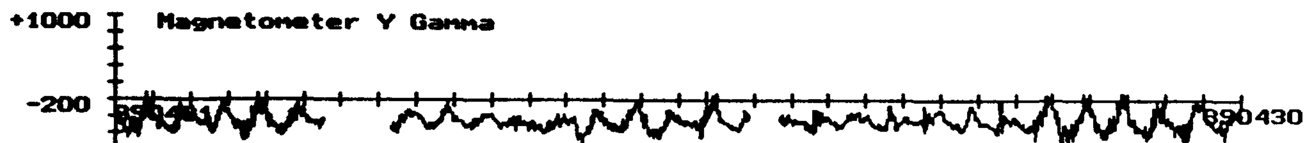



PLOT 119

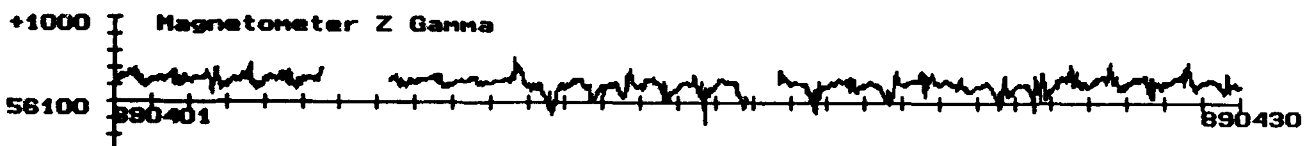
PLOT 120 RIOMETER 2 DATA UNAVAILABLE




PLOT 121




PLOT 122




PLOT 123